

Golder Associates

CONSULTING GEOTECHNICAL AND MINING ENGINEERS

Second Draft Report on

REMEDIAL INVESTIGATION

BLUFF ROAD SITE

RICHLAND COUNTY, SOUTH CAROLINA

VOLUME I OF II

Prepared For:

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South Carolina Department of Health and Environmental Control 2600 Bull Street J. Marion Sims Building Columbia, South Carolina 29201

Attn: Mr. James R. Ullery, P.E., Director

RE: SECOND DRAFT REPORT
REMEDIAL INVESTIGATION
BLUFF ROAD SITE

RICHLAND COUNTY, SOUTH CAROLINA

Gentlemen:

Enclosed is our Second Draft Report on the Remedial Investigation for the Bluff Road Site in Richland County. This comprehensive report presents the results of the investigation, our conclusions regarding the type and extent of contamination present at the site, and incorporates the SCDHEC and EPA comments presented at the February 18, 1986 meeting. All information contained in previous reports submitted on this project has been included in this report.

Golder Associates is pleased to have assisted SCDHEC with the Remedial Investigation on this project. It has been a pleasure to work with your personnel. If you have any questions or need further information, please call us.

Very truly yours,

GOLDER ASSOCIATES

Michael T. Feeney, P.E. Senior Engineer

MTF:mrs

Enclosure

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1.0 INTRODUCTION

The Bluff Road Site in Richland County, South Carolina, is about 10 miles southeast of Columbia (Figure 1). site was operated by South Carolina Recycling and Disposal, Inc. (SCR&D), as a storage, recycling, and disposal facility for waste chemicals from 1976 to 1982. In 1975, chemicals were stored at the site. An acetylene manufacturing facility was operated on the property prior to its use as a waste facility. A site visit in March, 1980, by the United Environmental Protection Agency (EPA) revealed leaking containers of volatile organic compounds. Chemicals were reportedly observed leaking from the drums and into drainage ditches and the on-site surface lagoon (originally used during the acetylene manufacturing operation to hold waste lime). Analysis by the EPA of drainage ditch sediments indicated the presence of organic compounds, halogenated organics, pesticides and metals (Reference 1).

A groundwater investigation was performed by the South Carolina Department of Health and Environmental Control (SCDHEC) in the fall of 1980. Groundwater samples revealed elevated levels of chlorinated organic solvents and lead. Resampling in August 1982 indicated that concentrations of organic compounds in the groundwater were increasing (Reference 2).

Preliminary clean-up of the site was performed in 1982 and 1983, partly under the Comprehensive Environmental Response Compensation Liability Act (CERCLA). Drums of chemicals and contaminated soil were removed and many areas were covered with gravel to provide clean roads. The onsite lagoon, material adjacent to the lagoon identified as lime, and a large above ground tank remained on site. Some reports indicate that an underground tank also remains on

site, however, this is not certain. An area in the rear of the site was cleared and used for detonation of shock sensitive materials during the site cleanup. This area is referred to as the demolition area.

Golder Associates was retained by SCDHEC to conduct a Remedial Investigation at the site to determine the type, extent, and degree of soil and groundwater contamination on and around the site. The investigation has included a surface geophysical survey, a soil gas survey, soil sampling and groundwater monitoring. The groundwater monitoring and analysis program was completed in two phases. Preceding each phase Golder Associates submitted an interim report. The first, titled "Proposed Initial Monitoring Well Program, Bluff Road Site, Richland County," was submitted in January 1985. The second interim report, submitted in July 1985, was titled "Proposed Second Phase Monitoring Well Locations".

This report is the comprehensive report for the Remedial Investigation at the Bluff Road site. The results of all investigations, sampling, and analyses for this project are reported, including the information presented in previous interim reports. This report describes the extent, degree, and type of contamination present in the on-site soils, the on-site lagoon, and in the groundwaters both on and off the Bluff Road site. The hydrogeology of the area, groundwater flow, and contaminant movement are also discussed.

2.0 INVESTIGATIVE APPROACH

conducting this Remedial Investigation Golder Associates employed a phased approach and proceeded in a stepwise fashion from one phase of the project to the next. At each phase of the investigation data was collected, analyzed, interpreted, and used to make a preliminary assessment of the extent of contamination within and around the site. This preliminary assessment was used to guide the next phase of the investigation. As additional data was collected the understanding of the physical characteristics of the site was improved and the preliminary contamination assessment was refined. In most instances, each phase of the investigation indicated that the areal extent of contamination was larger than had been anticipated after the preliminary assessment of data from the previous phase. Nonetheless, preliminary assessments were valuable in guiding the course of the investigation and arriving at a complete assessment of the physical characteristics and the extent of contamination present at the Bluff Road site. This section of the report presents a summary of the various phases of the Remedial Investigation and the technical methods used during each phase to investigate the site and surrounding area.

Golder Associates began the Remedial Investigation for this project in November 1984. The first phase of the project involved a review of reports from previous investigations and a literature search to determine general stratigraphy and groundwater conditions present in the region surrounding the site. This review allowed the development of a broad understanding of conditions affecting the site and guided the development of appropriate investigative methods for use in later phases of the investigation. The second phase of the investigation involved the col-

lection of soil, lagoon, and sludge samples from within the former SCR&D facility in order to evaluate the potential sources of contamination. Soil, lagoon water, and lagoon sludge samples were collected in January 1985, with chemical analyses being completed soon thereafter. A sludge sample from the above ground tank and additional lagoon water samples were collected in September and November, 1985 respectively.

Initial consideration of land outside the boundaries of the former SCR&D facility was made during the third phase of the investigation which was a geophysical survey. survey, conducted in December 1984, involved using a portable electromagnetic device to induce an electric current below the ground surface and measure the bulk conductivity of the soil mass. This data was reviewed in the field and the areas of geophysical investigation adjusted accordingly. At the time of the investigation there seemed to be little to no correlation between bulk conductivity and the existence of volatile organic contamination. Therefore, the fourth phase of the investigation, the initial well program, relied primarily upon the results of the previous SCDHEC investigation (Reference 2) and the study of regional hydrogeology to determine the proposed well locations and The initial wells installed by Golder Associates depths. were completed in March and April, 1985. Groundwater samples taken from the wells were analyzed for each priority pollutant volatile organic compound and representative selected samples were analyzed for all priority pollutants. initial well program allowed determination of site stratigraphy, the general direction of groundwater flow, approximate depth to which contamination extended, and the class of chemical compounds present in the groundwater.

In order to rapidly survey a large area in the general direction of groundwater flow for volatile organic contamination, a soil gas survey was conducted as the next phase of the investigation. The survey was carried out by making a series of shallow borings into the unsaturated soil above the uppermost aquifer, then withdrawing and analyzing a sample of gas from the unsaturated soil mass. The analysis of the gas indicated the presence, or lack, of volatile organic compounds in the soil gas surrounding the borehole. The soil gas survey indicated an area of contamination downgradient of the SCR&D site and these results were used to determine the initial locations of wells to be installed during the next phase of the investigation, the second well program.

The second well program consisted of installing additional wells to define the extent of the contaminated groundwater, establish the concentration of chemicals in the groundwater, and obtain hydrogeologic data to complete the definition of site stratigraphy and hydrogeology. second well program was completed in two stages. stage was carried out in August and September, Chemical analysis of groundwater samples taken after this first stage indicated such a large contaminated area that additional consultation with SCDHEC was needed to continue Also, permission to access additional property the work. was needed before the second, and final, stage of the program could be implemented. This access was obtained in November 1985, the second stage was begun immediately, and was completed in December 1985.

Also in December 1985, a pumping test was conducted at the site to determine, among other parameters, the hydraulic conductivity of the uppermost aquifer with a greater degree of confidence than could be obtained from grain size analyses of soil samples. In January 1986, treatability studies were conducted on contaminated soil and groundwater samples collected from the site. The purpose of these studies was to determine the potential effectiveness of leaching and aeration in removing contaminants from soil and groundwater.

The following sections of this report describe in detail each of the phases of the investigation at the Bluff Road Site. A complete description of the methods, results, and in some cases, interpretations made during the phase is given. Each of these phases was used to better understand the site conditions and the extent of contamination, and to focus the investigations of the following phases.

This report concludes with several sections which employ all the data collected to make a complete assessment of site and presents recommendations concerning continued monitoring and data collection at the site.

3.0 REGIONAL STRATIGRAPHY AND HYDROGEOLOGY

The Bluff Road Site is located in the Upper Coastal Plain physiographic province. In this area sedimentary deposits of Cretaceous and Tertiary Age overlie older crystalline rocks. Because the site is located near the Fall Line (the landward boundary of the Upper Coastal Plain) the sediments are thinner than those closer to the coast. Also, many formations present near the coast are not found among the sediments near the site. The major stratigraphic units present in the region are the Okefenokee, Black Mingo, and Middendorf Formations.

The surficial soils in the vicinity of the site consist of terrace deposits of the Okefenokee Formation. They are water deposited, irregularly interbedded deposits of sand, gravel, and clayey sands. The surficial sands are underlain by the Black Mingo Formation. Regionally the formation consists of an upper portion of dense, massive gray clay and a lower portion of coarse-grained, cross-bedded sands. The predominant clay mineral in the upper portion is montmorillonite with quartz, opal, calcite, and mica minerals also being present. The lower portion of the Black Mingo Formation consists of coarse-grained sands sometimes containing glauconite. These sands are very similar to those in the underlying sediments.

The Middendorf Formation is the deepest of the sediments in the region and directly overlies the crystalline rocks. Near the Fall Line the formation was deposited in a fluvial environment and consists of irregularly interbedded sand and gravel, light colored feldspathic and kaolinitic sands, and lenses of kaolin. Some upper beds exhibit a distinctive purple and white mottling.

The hydrogeology of the sediments in the region is relatively simple. The surficial sand is the uppermost aquifer of the region. Recharge is by infiltration of rainfall from the ground surface. Water in this aquifer is typically slightly acidic with low total dissolved solids. However, natural iron concentration may exceed drinking water standards in some locales. Yields from this surficial aquifer are generally sufficient for domestic use (Reference The clay underlying the surficial sands is an aguitard restricting the downward flow of groundwater from the surficial aquifer and serving as a confining layer for underlying aquifers. The sands of the lower Black Mingo and Middendorf Formations are very similar and are hydraulically connected. These strata constitute a confined aquifer. This is an important aquifer in the region with yields generally sufficient for irrigation or industrial use. Water quality is suitable for most purposes. The aquifer is primarily recharged in the Formation's outcrop area near the Fall Line.

4.0 PREVIOUS INVESTIGATIONS

The first investigation conducted on the SCR&D site was performed by the Surveillance and Analysis Division of the U.S. Environmental Protection Agency (EPA). Results are described in their report entitled "Groundwater and Surface Water Investigation, South Carolina Recycling and Disposal, Inc., Bluff Road Site, Columbia, South Carolina" July 1, 1980. During their site visit (March, 1980), the investigators noted "numerous examples of spillage and/or leaking drums in the drum storage area", "chemical spillages exist in direct contact with water pooled in the old filled lagoon", and "badly contaminated surface water drains directly to a swampy area adjoining the site." Fourteen water and soil samples were obtained. These included soil samples from the SCR&D site, water and sediment samples from drainages features near the site, water samples from local water wells, and water and sediment samples from Myer's Creek.

A variety of metals were present in soil and water samples collected on and around the SCR&D site. Possible sources of the metals include deteriorated drums, natural soil metals, and waste lime, as well as spilled hazardous wastes. Surface water and sediment samples from the lagoon area showed elevated levels of calcium when compared to the other samples. Water from the SCR&D well exceeded secondary water quality standards for iron and manganese and approached primary drinking water standards for lead. EPA concluded that the sediment and water samples from Myers Creek were within normal ranges.

Organic compounds found in surface water and soil samples from the SCR&D site included phthalates, pesticides, other aromatic compounds including chlorinated benzene and

phenols, and other compounds tentatively identified as organics by EPA. Volatile organic compounds were not found in the surface soils, although drums of volatile compounds were observed to be leaking. Volatile organics were found in surface water samples. Traces of phthalates were found in both surface water and groundwater. A trace of dieldrin was found in the Campbell's Garage Well which EPA proposed may have been due to termite or ant control practices.

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Groundwater conditions at the site were investigated by SCDHEC and described in their report entitled "Investigation of Groundwater at South Carolina Recycling and Disposal Company, Bluff Road Site, Richland County, South Carolina" (January, 1981). Investigators installed eleven shallow monitoring wells around the SCR&D site and Campbell's Garage with screened intervals varying between 9 feet and 22 feet in depth. Water level measurements indicated a shallow, relatively flat water table, with flow to the east and northeast.

Initial groundwater quality sampling was performed by SCDHEC in September, 1980. Specific conductance of the water samples varied from 20 to 1500 micromhos/cm (umhos/cm) with a pH between 5.0 and 6.0. Lead was found in many wells in excess of drinking water standards (0.05 ppm). Volatile organic compounds were found in many wells. Some of these compounds may be attributable to the use of PVC solvent cement in well construction. However, both the number of volatile organic compounds and the concentrations were greatest in wells downgradient of the SCR&D site and Campbell's Garage. These results led SCDHEC to conclude that groundwater contamination existed at the site and was moving at a relatively slow rate to the northeast and southeast.

Groundwater sampling was again performed by SCDHEC in August, 1982, and the results published as an addendum to their 1981 report. Resampling showed an increase in both the number and concentration of volatile organic compounds, leading SCDHEC to conclude that the groundwater quality surrounding the site continued to be degraded.

5.0 ON-SITE SOIL, LAGOON, AND TANK INVESTIGATIONS

5.1 Overview of On-Site Investigations

An investigation of the soil, lagoon, and aboveground tank within the boundaries of the former SCR&D facility was made in order to characterize potential sources of ground-water contamination and to determine the degree of contamination remaining on-site. The majority of this phase of the Remedial Investigation was completed in January 1985, although selected samples were obtained in September and November, 1985. Each area of the on-site investigation is presented in detail in the following subsections.

5.2 Soils

The near-surface soils on-site were investigated by a series of 18 shallow borings drilled on January 22 and 23, 1985 at locations shown on Figure 2. The purpose of these borings was to determine the variability of soil contamination with depth and plan location on the site. Borings were located on approximately 50 foot centers across the site and boring depths ranged from 4.5 feet to 15.5 feet. Borings were not extended below the water table. A drilling rig could not access the location of boring ST18 due to very soft soil conditions which were later determined to be a closed, lime filled lagoon.

A total of 65 split spoon samples were obtained from the borings at various depths to provide representative samples of the various soil strata. Each sample was immediately placed in a glass sample jar and the lid tightly sealed. A visual description of each sample was made in the field and used to develop a log showing the strata in each boring. These boring logs are included in Appendix A-1.

Field indications of chemical contamination in the soil were obtained using an organic vapor analyzer (OVA) operated by Mr. Chris Staton of SCDHEC. Readings of the concentration of organic vapors were obtained by analyzing the vapors inside the glass sample jar. Readings of samples taken on January 22 were made a few minutes after sampling. January 23, all readings were taken at the end of the day because of an earlier OVA breakdown. OVA readings varied from 1 to 90 parts per million (ppm) with most readings between 10 and 50 ppm. Some organic vapors were detected in almost every sample. Individual sample readings are noted on the boring logs in Appendix A-1. The conditions under which sample readings were taken was rather variable. air temperature was approximately 35°F and the wind was As described above, the waiting time between sampling and the OVA reading also varied. Because of these conditions, the OVA readings are considered useful only as an indicator of the presence of contamination and not a measure of a specific concentration of contamination.

Cross-contamination between samples and borings was prevented by steam cleaning the split spoon sampler between samples and steam cleaning the sampler, hollow stem augers, and working areas of the rig between borings.

The OVA readings obtained in the field indicated that the on-site near surface soils are contaminated virtually throughout the site from the ground surface down to the water table. In order to determine the approximate concentration of compounds present in the soil, representative samples were selected for laboratory chemical analyses.

In selecting samples for analysis, the OVA readings were used to identify a group of five soil samples which were considered to represent on-site conditions. Equal weight portions from each sample were combined to form a single composite sample. The composite sample was analyzed for priority pollutants. The analysis showed that volatile organics and metals were present in the soils. Priority pollutant pesticides, PCB's, base neutral, and acid extractable compounds were not present above the method detection limit for soils. Analysis results are presented in Appendix C. This analysis indicates that volatile organics and metals are the only classes of compounds present in high concentrations or located throughout the site. The other classes of compounds, if present at all, seem to be confined to one or more small areas.

After completing the analysis of the composite sample, local 18 soil samples (including the five used to form the composite) from various depths and locations on the site were selected for volatile organic analysis. The observed concentrations varied from the method detection limit to 23,465 parts per billion (ppb). Values greater than 1000 ppb were observed only within 5.5 feet of the ground surface at test locations ST10, ST12, ST17 and ST19. Values less than 1000 ppb, and usually below 100 ppb, were noted at all test locations. Complete analysis results are presented in Appendix C.

In evaluating these analytical results, it should be noted that there are a number of difficulties associated with sample and analyzing soils for volatile organics. Volatile compounds volatilize from the time of sampling until the sample jar is sealed. Even after sealing, compounds continue to volatilize and become diluted in the air

inside the sample jar. Selecting representative portions of soil from the jar for analysis is difficult since standard soil handling procedures such as drying, splitting, and mixing cannot be used. Because of these difficulties the absolute level of the compounds indicated by the analysis may not correspond to the concentrations present in-situ. However, since all samples are subject to the same handling effects the relative levels of the compounds should be accurate. Because of the difficulties in conducting the analyses the chemical lab, Applied Biology Inc., elected to do a second analysis of the 18 soil samples. The second analysis generally indicated lower concentrations of volatile organics. Applied Biology Inc. indicates that they consider the relative concentrations determined during the second analysis to be more accurate than in the first analysis since some of the laboratory handling procedures were modified. Results of the second analysis are also included in Appendix C.

5.3 Lagoon

Golder Associates sampled the water and bottom sediments from the on-site lagoon in January 1985. Sampling locations are shown on Figure 2. To assist in determining sample locations, the lagoon was surveyed using using a nearby base line. Offsets from this base line were determined by taping and turning right angles with a hand held optical prism. During the survey, parallel lines of flagged stakes were established around the lagoon in order to locate lagoon sampling locations.

Lagoon sampling was carried out by two Golder personnel in a 12 foot aluminum boat propelled by poling. Water samples were obtained by filling sample jars directly from the lagoon, and sediment samples were obtained by driving a 1"

ID thin-walled piston sampler into the sludge. The depth of lagoon water at the time of sampling and the thickness of the sediments were estimated by marking depths at 6 inch increments on the piston sampler and rods. Six samples each of lagoon sediment and water were obtained during the sampling program. Lagoon sampling locations are shown on Figure 2.

At the time of sampling, maximum water depth in the lagoon was 3.5 feet. The top of the sediment consisted of a very soft layer of organic material one or two inches thick. This was underlain by a layer of hardened lime estimated to be about 3 inches to 6 inches thick. Below this, a layer of soft lime was encountered approximately 1.0 feet to 1.5 feet in thickness. This thickness was estimated by determining the depth to probe refusal of probes which penetrated the soft lime. In some areas, probe refusal was reached in the hard lime 3 inches to 6 inches below the top of the sediment.

Priority pollutant analyses were performed on composites of the six water and six sediment samples. The composite water sample had a pH of 7.7 and a specific conductance of 492 umhos/cm. No priority pollutant organic compounds, including pesticides, PCB's, acid, base neutral, extractable, or volatile compounds were present in the composite water sample above the Method Detection Limit (MDL). Copper (0.152 ppm) and magnesium (0.12 ppm) were the only priority pollutant metals present in concentrations exceeding 0.1 ppm. The magnesium is probably associated with the lime remaining from the acetylene manufacturing operation. The analysis results are reported in Appendix D.

The composite sediment sample had a pH of 11.5 and a moisture content of 56 percent by weight. It did not contain pesticides, PCB's, or acid extractable compounds above the MDL, but did contain ethylbenzene (23 ppb) and naphthalene (18 ppb). The predominant metal present was magnesium (170 ppm). This level is not surprising considering the high amount of lime present in the sediment. Arsenic (19.8 ppm), nickel (17 ppm), and zinc (9.4 ppm) were the only priority pollutants present in the sediment at concentrations greater than 5 ppm. Complete analytical results are included in Appendix D.

These composite analyses indicated that the lagoon water was virtually uncontaminated and the lagoon sediment was only slightly contaminated. Because of the results of the composite analysis, and because there was no reason to expect wide variation in the composition of the individual water and sediment samples, it was decided, after consultation with the SCDHEC, that analyses of the individual water samples were unnecessary and that individual sediment samples would be tested only for selected metals. The metals chosen were copper, arsenic, and chromium. Concentrations in the individual sediment samples varied from 0.50 ppm to 10.6 ppm. Complete results are included in Appendix D.

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5.4 Above-ground Tank

A tank remaining from the surficial cleanup lies on the ground surface just inside the fence line near Bluff Road. The cylindrical steel tank is approximately 5 feet in diameter and about 20 feet long. The outer surface of the tank is rusty, but no holes, bulges, or other signs of serious deterioration are evident. The only openings evident are several round holes at the top of the tank.

Golder Associates sampled the material in the tank in September 1985. The tank contained no ponded fluid but contained about 0.5 feet of sludge. A sludge sample was obtained by inserting a one-inch diameter PVC pipe into the sludge and scraping the sludge which stuck to the pipe into a sample jar. The sludge was black and dark brown with an oily appearance. The sample was analyzed for priority pollutants. Analysis results indicate that the sludge is composed primarily of 2-chlorophenol and Phenol at concentrations of 33,300 ppm and 13,774 ppm respectively. Trichloroethylene, 2,4-Dichlorophenol, and 2,4,6-Trichlorophenol were the only other priority pollutants indicated by the analysis. Complete sample results are included in Appendix E.

Golder Associates submitted the chemical analysis results for review by an industrial hygienist subcontracted to Golder Associates on this project. The hygienist concluded that direct contact with these compounds would pose an immediate danger to life and health and that short-term exposure to vapors of these compounds poses a health risk. Golder Associates requested that the tank be removed from the site but learned that EPA emergency funds were not available for removal.

6.0 SURVEY OF SCDHEC WELLS

In August 1985 Golder Associates made a complete survey of the wells previously installed on this project by SCDHEC (Reference 2). These wells had been installed to determine if groundwater contamination was present and approximately located on the perimeter of the former SCR&D site. Due to the preliminary nature of the investigation and the limited budget available at the time, each well was constructed of 2 inch PVC pipe and screen glued together with PVC cement, and no locking covers were installed. The details of each well surveyed are reported below and their locations are shown on Figure 3.

Well W-l was found intact with the cap marked "l" in place. This well is located on the east side of Bluff Road approximately 20 feet from the road in some tall weeds. The depth of the well taken from the top of a 2.5 foot stick-up is 24.95 feet. Depth to the water was 12.25 feet from the top of the casing on August 22, 1985.

Wells W-2 and W-3 could not be located and are presumed to be destroyed.

Well W-4 was found with the casing broken at the ground surface and a piece of PVC lying beside the well. The cap on the broken casing was marked "4". The depth to the water was 7.25 feet from ground surface on August 22, 1985. The total depth was not measured. At the request of SCDHEC, Golder Associates sealed this well on December 6, 1985 by filling the inside of the casing to the ground surface with bentonite pellets.

Well W-5 was previously reported destroyed by SCDHEC (Reference 2) and could not be located.

Well W-6 was found intact in a marshy area on August 22, 1985. Four days later it stood in 3 inches of water due to rain. The cap marked "6" had brown stains on it indicating that water may have completely submerged this well in the past. The total depth was 12.35 feet from the top of the 0.7-foot stick-up. Water was 6.95 feet from the top of the casing on August 22, 1985.

Well W-7 was found intact, with the cap in place, standing in 3 inches of water. The cap was marked "W-7". The stick-up was 0.6 feet and the depth was 12.45 feet from the top of the casing. Depth to water on August 22, 1985 was 6.95 feet from the top of the casing.

Well W-8 was found intact standing in a wet soil area under a fairly thick tree cover. The cap was marked "8". The total depth measured from the top of a 0.5-foot stick-up was 12.55 feet. The depth to the water was 7.25 feet from the top of the casing on August 22, 1985.

Well W-9 was found completely intact in a wooded area with heavy undergrowth. The information on well depth and depth to water is unknown.

Well W-10 is located in a marshy area but there was no standing surface water in this area on August 22, 1985 when the water level in the well was measured. Four days later there was 3 inches standing water in the area from rainfall. A brown stain on the casing six inches above the ground surface indicates water in this area has been at least as deep as 6 inches. The well was intact with a cap marked

"10". The total depth measured from the top of the 1.0 foot stick-up was 15.85 feet. The water level measured on August 22, 1985 was 6.25 feet from the top of casing.

Well W-ll was found in a wet area under a fairly thick tree cover. Due to the 0.3-foot stick-up and color of the protruding casing it seems likely that this well at times is completely submerged. The total well depth was 11.95 feet from the top of the casing. The depth to water on August 22, 1985 was 6.25 feet from the top of the casing.

7.0 GEOPHYSICAL SURVEY

7.1 Overview

Golder Associates' first off-site investigation at the Bluff Road Site was a surface geophysical survey. A geophysical survey is a rapid, relatively inexpensive and non-intrusive means of gaining preliminary contamination information over a large area. It is often useful for locating areas for further testing, but can be interpreted most accurately when correlated with borings or test pits. An eletromagnetic induction conductivity instrument, the Geonics EM-34-3, was selected for use in this investigation because of its applicability to the soil conditions, ease of operations, and cost effectiveness.

A primary limitation of conductivity surveys is the inability to readily detect volatile organic compounds in groundwater because these compounds do not usually increase the conductivity of groundwater. Nonetheless, considering the specific conductivities of up to 1500 umhos/cm measured by SCDHEC in 1980 (Reference 2), it was decided by SCDHEC and Golder Associates to perform the geophysical survey.

7.2 Methods

The Geonics EM 34-3 instrument used for the survey works by electromagnetic induction. An alternating current is produced in the transmitter coil, which induces a magnetic field in the surrounding soil. This sets up a secondary electric current in the soil, which is sensed by the receiver coil. The instrument measures conductivity in units of millimhos per meter (mmho/m). Because the current is induced in the ground indirectly, there is no need for the probes, lead wires, etc., associated with conventional electrical surveys.

The survey was primarily carried out with the coils held vertical and a coil separation of 33 feet (ten meters). In this configuration about 85% of the reading will be contributed by soils less than 33 feet deep. In a stratified soil, the bulk conductivity reading will be biased toward the more conductive layer.

Some readings were taken with coils held vertical and a coil separation of 66 feet (20 meters). This configuration affects a larger volume of soil, horizontally and vertically, than does the 33 foot spacing, and is less influenced by small scale variations in conductivity. These readings were used primarily to confirm or discount apparently spurious readings.

The Bluff Road Site and the immediately adjacent areas were surveyed using a 33 foot coil separation taking readings on approximate 50 foot centers. Areas further from the site were surveyed on approximately 100 foot centers. Selected points on and near the site were re-measured using a 66 foot coil separation. Areas of high local conductivity variation as determined using the 33 foot coil separation tended to have a conductivity closer to the average when measured by the 66 foot coil separation; otherwise, no systematic variation in conductivity with coil separation was noted. Some high readings were noted in the vicinity of old fences along the former facility boundaries and power lines alongside Bluff Road. In all, over 120 conductivity readings were taken. All locations were flagged at the time of the survey and were located in relation to existing wells and landmarks by compass and pace methods. Selected traverse end points were later located by a registered land surveyor.

7.3 Results

The geophysical data and a contour plot of bulk conductivity is presented as Figure 4. Α pronounced conductivity high in the 40 to 90 mmho/m range was located adjacent to the existing lagoon; this area appears to be a closed lagoon. Relatively high conductivity, on the order of 20 mmho/m, was found over the north-northeast corner of the site. Somewhat elevated conductivities, 10 mmho/m or more, were found over most of the rest of the site, the right of way between the site and Bluff Road, an area behind the former Campbell's Garage near a channel carrying surface run-off from the site, and along a line extending from the high area adjacent the lagoon in a north-northeast direction toward the demolition area.

Other areas adjacent to the site exhibited bulk conductivities of 4 to 7 mmho/m. This appears to be background for the area. About 400 feet northeast of the site, conductivities of 10 mmhos or more were noted, increasing to 20 mmhos/m about 800 feet from the site. Explanations for the observed conductivities is presented in Section 7.4.

7.4 Interpretation

Bulk soil conductivity as determined by the geophysical survey may be approximately compared to groundwater conductivities listed in SCDHEC's report (Reference 2) by application of Archie's Law (Reference 3), as shown below:

$$C_{R} = C_{F} n^{m}$$

where: C_B = the bulk conductivity of the soil mass,

 C_F^D = the conductivity of the pore water, n = total porosity of the soil, and

m = total porosity of the soil, and m = a constant ranging from 1.3 to 2. A porosity (n) of 35% and an m value of 1.4 was assumed. It was also assumed that the soil and water were homogeneous with depth, and that the contribution to bulk conductivity of soil above the water table was minor. SCDHEC's report lists background water conductivities at the site perimeter of about 50 to 100 micromhos per centimeter(5 to 10 mmho/m) and elevated conductivities of about 500 to 1,500 micromhos per centimeter (50 to 150 mmho/m) for contaminated water. Using the n and m values assumed above, soils saturated with these waters would have a calculated bulk conductivity of 1 to 3 mmho/m for the background water and 11 to 35 mmho/m for the contaminated water. The background readings of bulk conductivity in the 4 to 7 mmho/m range near the site are slightly higher than the calculated values. This is possibly due to the clay content of the soil. Elevated bulk conductivity readings of 10 to 40 mmho/m encountered on site and in some adjacent areas correlate well with the values calculated from SCDHEC's water data. The very high (75 to 90 mmho/m) readings found adjacent to the existing lagoon are apparently due to a closed lagoon filled with lime or a similar material. Such a material would be expected to have a high water content and pore water conductivity would be high due to ions dissolved from the lime in the lagoons. The area of high conductivity beginning about 400 feet from the site, and extending northeast, did not correlate with later data indicating the extent of contaminated groundwater. This high conductivity area is most likely related to the increasing clay content of the soils in this area.

In summary, the results of the geophysical survey correlated well with information about the site available at the time of the survey. However, the survey results did not indicate a pattern of high, or low, conductivity readings

which correlated with the direction of groundwater flow. Therefore, Golder Associates concluded that the geophysical survey did not identify any areas which were likely to be contaminated with organic solvents.

8.0 INITIAL WELL PROGRAM

8.1 Overview

The initial groundwater monitoring program consisted of the installation of eight monitoring wells. Five of these wells were installed in the surficial aquifer at depths less than 50 feet. Three of the wells were installed below the surficial aquifer at depths ranging from 95 to 115 feet. Cross-hole contamination and introduction of contaminants into the well or groundwater was avoided through careful cleaning procedures, as listed below:

- 1. All drilling equipment was degreased and cleaned prior to drilling to minimize the potential for contamination introduced to the well from an outside source. All drilling tools were steam cleaned on-site prior to drilling each borehole to minimize potential cross-contamination from the wells.
- 2. The split spoon samplers were cleaned with water between samples to reduce the potential for cross-contamination. The water was from the county water supply system.
- 3. All PVC well pipe and screen materials were steam cleaned prior to use. Latex gloves were worn by personnel during installation. Filter fabric used around the well screen was steam cleaned prior to use. The sand filter material was a commercially produced silica sand.
- 4. On many occasions it was necessary to wash the sand out of the hollow stem auger with water prior to obtaining the sample. This water was obtained from the county water supply system.
- 5. A locking protective steel cover was cemented over each completed well to protect the well head. The cover was painted with a rust preventive paint and locked.

8.2 Surface Aquifer Wells

Five wells, BP-1 through BP-5, were installed in the surficial aquifer. Each of these wells contains multiple piezometric tips evenly spaced along the length of the well. The multiple tips were used to determine the vertical variation in piezometric head and for sampling the groundwater at various depths within the surficial aquifer.

Wells BP-1 and BP-2 were constructed using several tubes of flexible 3/8-inch inside diameter polyethylene secured to the outside of 1 inch inside diameter Schedule 40 flush threaded PVC pipe. The lower end of each polyethylene tube was connected to approximately 7 inches of vyon, a porous polyethylene tubing which served as the piezometric The bottom 2.5 feet of the PVC pipe was slotted to serve as the deepest piezometric tip. This "bundle" of piezometers was inserted into the hollow stem of the drill augers after completion of drilling and sampling. augers were then withdrawn from the hole and the soil allowed to collapse against the piezometers. Wells BP-1 and BP-2 consist of 10 and 9 piezometric tips, respectively. A monitoring well installation log showing the elevation of each tip and other well construction details is included in Appendix B of this report. Well locations are shown on Figure 3.

Wells BP-3, BP-4, and BP-5 consist of four piezometric tips each. Each well was constructed of three l-inch diameter PVC pipes and one 2-inch diameter PVC pipe. The piezometer tips are slotted PVC screen sections attached to the bottom of the PVC pipes. All PVC pipe and screen was flush threaded and all joints were teflon taped. Wells were constructed by inserting the three l-inch PVC pipes into the hollow stem augers and then withdrawing the auger allowing

the hole to collapse around the pipes. The 2-inch pipe was then lowered to the desired depth into the annular space after withdrawing the augers, sand placed to a level above the screen, a bentonite seal placed above this and, the remainder of the hole grouted. Piezometer tips were placed at depths of approximately 12 feet, 20 feet, 34 feet, and 44 feet. Well construction details are summarized in Table 1. Exact screened intervals and other well construction details are shown on the monitoring well installation logs in Appendix B. Well locations are shown in Figure 3.

8.3 Deep Wells

Three deep wells, DW-1, DW-2, and DW-3, were installed with screens located in the Black Mingo Formation underlying the surficial aquifer. Each well was installed in a telescoped fashion to insure that contaminants present in the surficial aquifer would not migrate along the well bore into the Black Mingo Formation.

The deep well drilling began with a 9 inch borehole and was mud-rotary drilled through the surficial sands to about five feet into the underlying Black Mingo clay. Then a 6 inch diameter, flush threaded, PVC casing was installed in the hole. Cement grout was then tremied into the annular space between the PVC casing and the sides of the borehole.

After the cement grout had set, and the drilling equipment had been steam cleaned, drill tools were inserted inside the 6-inch PVC casing and a 5-inch diameter hole was mud rotary drilled using bentonite mud from the top of the Black Mingo formation to the bottom of the boring. A 2-inch diameter PVC screen and casing was then inserted into the hole and the sand pack placed around the screen. The hole was then developed by jetting potable water down the PVC

pipe and out through the well screen. This jetting action flushed the drilling mud cake off the sides of the borehole and removed the drilling mud from the hole. After jetting, the bentonite seal was placed above the sand pack and allowed to hydrate. The remainder of the hole was grouted with cement grout. A locking steel cover was installed to protect and secure the well head. Exact screened intervals and other well construction details are shown in the monitoring well installation logs in Appendix B. Well locations are shown on Figure 3.

8.4 Initial Well Sampling

Water samples were obtained from Wells BP-1 through BP-5 and DW-1 through DW-3 soon after their completion in the Spring of 1985. A sample was also obtained from Myers Creek, which is the first surface water drainage feature downgradient of the site. Further details of the sampling methods and analytical results are discussed below.

8.4.1 Sampling Methods

Wells BP-1 and BP-2 were sampled using a positive displacement method. For this method, a 1/4 inch tube was inserted inside the 3/8 inch polyethlene tube leading to the vyon piezometer tip. Then compressed nitrogen gas was used to pressurize the inside of the polyethlene tube. This pressure forced the water up into the 1/4 inch tubing and into the sample container. Note that this method did not aerate the sample or subject the sample to reduced vapor pressures. A new 1/4 inch tube was used to sample each piezometer tip to prevent the possibility of cross contaminating the samples.

The three deep wells, along with Wells BP-3, BP-4, and BP-5 were sampled using a peristaltic pump located at the ground surface. A new 3/8 inch polyethlyene tube was inserted inside each well casing and the upper end was connected to the peristaltic pump. The sample was suction pumped from the well through the peristaltic pump, into the sample container. Samples collected for metals analyses were filtered with a 0.45 micron filter as they passed through the peristaltic pump.

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Samples from Myers Creek were obtained at the location shown on Figure 3 by immersing the sample jar in the creek. Sample containers for all wells and Myers Creek were completely filled. Sample containers were prepared and, when appropriate, preservatives added in advance by Advanced Chemistry Labs of Atlanta, Georgia, the chemical laboratory responsible for analyzing these samples.

8.4.2 Analytical Results

All of the samples obtained in the Spring of 1985 were analyzed for each of the priority pollutant volatile organic compounds. Based on analyses of soil samples and earlier groundwater analyses performed by SCDHEC, it was decided that volatile organic analysis would be used as the indicator analysis for contaminated groundwater. One of the samples was selected for a priority pollutant scan. The results of the chemical analyses showing each compound detected, are presented in Appendix E of this report and are discussed below. Results of volatile organic analyses are summarized in Table 2.

The volatile organic analysis results indicate that in Myers Creek and in Wells DW-1, DW-2 and DW-3, no volatile organic compound was present at concentrations above the

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Method Detection Limit (MDL). Volatile organics were not generally present in Well BP-2, but piezometer tips at 22.5 feet and 27.5 feet did show 11 ppb and 12 ppb, respectively, of chloroform. These low levels are not considered to be conclusive evidence of contamination and, at the spring sampling, BP-2 was considered to be uncontaminated.

Volatile organic analyses on samples from Wells BP-1, BP-3, BP-4 and BP-5 identified a variety of compounds. Those present most frequently were:

Benzene Tetrachloroethylene
Ethylbenzene Toluene
Carbon Tetrachloride 1,2-Trans-Dicholoroethylene
Chloroform 1,1,1-Trichloroethane
1,1-Dichloroethylene 1,1,2-Trichloroethane
Methylene Chloride Trichloroethylene
1,1,2,2-Tetrachloroethane

These compounds were present in concentrations ranging from the Method Detection Limit to 30,635 ppb of 1,1,1-Trichloroethane found in Well BP 4, tip 4. The chemicals listed above were typically identified in concentrations in the hundreds or thousands of parts per billion. Compounds which were occasionally present, in concentrations from about 10 to 100 ppb, were Chlorobenzene, 1,3-Dichloropropene, 1,2-Dichloroethane, and Chlorodibromomethane.

A priority pollutant scan was made on a highly contaminated water sample collected from Well BP 3, tip 3. This analysis identified three phenolic acids and three base neutral benzene compounds present in concentrations ranging from 4 ppb to 281 ppb. Some metals were also present at

concentrations less than 0.1 ppm. The priority pollutant scan confirms that the primary groundwater contaminants are the volatile organic compounds.

Analysis of samples from each of the tips in the five multi-level piezometers showed that volatile organics were present at all depths in the surficial aquifer but were generally at higher concentrations within 30 feet of the ground surface. Profiles showing the variation of contaminant concentration with depth for the frequently occurring contaminants are included as Appendix G of this report. These profiles also suggest, though not conclusively, that the peak contaminant concentrations in Well BP-5 occur at somewhat greater depths than in BP-3 and BP-4. This indicates a possibility that contaminants may be moving deeper into the aquifer as the plume moves downgradient.

9.0 SOIL GAS SURVEY

9.1 Overview

In order to estimate the areal extent of off-site migration of groundwater contaminated by volatile organics prior to drilling additional wells, a soil gas survey was conducted. The survey was performed by drilling holes approximately 7 feet deep, evacuating the soil gases from the hole and analyzing the soil gases for contaminants using an organic vapor analyser (OVA) equipped with a portable gas chromatograph. The details of the survey methods and results are discussed below.

9.2 Analytical Methods

The soil gas survey was carried out with a Foxboro 128 flame ionization organic vapor analyser with a gas chromatograph. The chromatograph column was 12 inches long and packed with 10% 1,2,3(tris) 2-cyanoethoxypropane on chromasorb AW, 60 to 80 mesh. An instrument signal intensity of 3.0 and a sample flow rate of 1.5 to 2.0 liters per minute were used for all tests. Chromatograph results were printed with a strip chart recorder at a rate of 90 seconds/inch.

Because elution time (travel time through the chromatograph column) is a function of ambient temperature, soil gas samples were compared against a calibration gas standard containing about 10 parts per million (ppm) each of analytical grade methylene chloride, trichloroethylene, and perchloroethylene in a matrix of ultra-pure air. The calibration gas was also used to check for drift in the sensitivity of the instrument, of which none was found.

During the initial phase of the investigation gas chromatograph scans were obtained from the head space of jars containing contaminated water samples and from inside the casings of wells known to be contaminated. These scans were compared to the scans made in soil gas borings adjacent to the contaminated wells. The gas chromatograph results were very similar for the soil gas samples, water head space samples, and well casing gas samples. This indicates that contaminated soil gases are a good indicator of contaminated groundwater. These typical chromatograms are presented in Figure 5.

Because the contaminants in the groundwater are a complex mixture of priority pollutants, together with an unknown number of degradation products, no attempt was made to correlate a specific chromatograph peak with a specific contaminant. However, the chromatograms from areas of known contamination yielded a distinctive series of four or more early arriving peaks and the resulting contaminant "signature" was used to identify contaminated soil gas in other Also during the early phase of the investigation, chromatograms of soil gas were taken from areas upgradient of the site to determine the chromatograph signature of naturally occurring organic vapors in the soil. chromatograms were strikingly different from those in the contaminated areas (Figure 5). Therefore, this investigation approach was very useful in identifying off-site areas of organic contamination around the Bluff Road Site.

9.3 Field Methods

At each soil gas survey location a hand augered boring was made and PVC casing placed in the upper part of the hole. The boring diameter was either 1-1/4 inches or 2 inches, depending on the type of auger used, and the

casing was Schedule 40, 1.5-inch or 2-inch inside diameter PVC pipe. In order to maintain a tight fit the casing was driven as the hole was drilled, keeping the casing only a few inches above the bottom of the hole. The casing was driven to a depth of two feet, after which the boring was continued to a depth of seven feet. Bentonite slurry was placed around the top of the casing to achieve a seal between the casing and the soil, and an air tight fitting was connected to the well casing and to the sampling port of the organic vapor analyser/gas chromatograph.

Prior to each soil gas test a record was made of the test location, the strata encountered in the boring, the date and time of sampling, and the ambient temperature at time of sampling. At the start of the test each boring was purged with the organic vapor analyser set to survey mode until the survey reading stabilized. The survey reading was taken without passing the gas sample through the chromatograph column and it reflects the total concentration of organic vapors in the soil gas. If more than about 5 ppm of organic vapors were detected, the soil gas was injected to the chromatograph column, and the chromatograph signature was determined. Thus, the survey reading gave an indication of the level of organic vapors in the soil gas, and the chromatograph signature established whether the organic vapors were natural or an indication of contaminated groundwater.

Information recorded during each test included time and rate of purging, the soil gas reading taken in the survey mode, whether a chromatograph scan was performed, the nature of the chromatograph signature, and other pertinent information. Calibration gas was sampled about twice a day,

with a survey reading (to check for instrument drift) and a chromatogram (to assess the effect of ambient temperature on elution time) being run.

At some locations, the soil gas was so highly contaminated that it did not contain enough oxygen to support combustion. In this case, the survey reading would gradually rise as the well was purged until the flame in the flame ionization detector was extinguished and the reading fell back to zero. The instrument was then disconnected from the well, relit, and reconnected to the well only long enough to inject a gas sample into the chromatograph column. Purified ambient air was then used to carry the soil gas sample through the chromatograph column, and a chromatograph signature was obtained. The survey reading prior to "flame out" thus represented a minimum soil gas reading and the chromatograph signature indicated the nature of the soil gas.

9.4 Survey Results

Soil gases were surveyed at 24 locations, shown in Figure 6, most of which were located downgradient of the site. Tests at uncontaminated locations indicated natural organic vapors in concentrations between 1 and 7.7 parts per million (ppm). Tests at contaminated locations gave survey readings as high as 300 ppm and could be identified, using the chromatograph column, at concentrations as low as 4.8 ppm. Tests were generally conducted near the site at the beginning of the program, with later tests located progressively further from the site until the edge of the zone of contaminated soil gas was found.

The area of highly contaminated soil gas (survey reading greater than 25 ppm) extends about 600 feet east from the on-site lagoon. The area becomes broader with increasing distance from the lagoon, reaching a maximum width of about 300 feet. The highly contaminated zone is bounded on the north by an area of lesser contamination (5 to 25 ppm) up to 150 feet wide, while on the south and east the zone of lesser contamination is much narrower. The plan extent of these areas is shown in Figure 6. It should be noted that the surficial soils encounterd in the eastern end of the zone of high soil gas concentrations contained significantly higher clay content than soils at other locations surveyed.

10.0 SECOND PHASE WELL PROGRAM

10.1 Objective and General Information

The second phase well program consisted of the installation of 17 monitoring wells (P-6 through P-22) at the locations shown on Figure 3. The objectives of the program were to define the extent and concentration of the plume of contaminated groundwater; to determine the background water quality in the surficial aquifer; and to provide additional details relating to the piezometric surface and flow direction in the surficial aquifer. The second phase well program was completed in two stages due to the large contaminated area. Wells P-6 through P-16 were installed in late August and early September 1985. The remaining wells, P-17 through P-22, were installed in the late November and early December 1985. The wells were drilled, with the exception of P-17, to a depth of approximately 50.0 feet and were screened throughout the entire thickness of the surficial aguifer. Well P-17 was terminated at a depth of 20 feet and screened to the top of the aquifer. In order to minimize the potential for cross-hole contamination and the potential for introducing contamination into the wells or groundwater the drilling equipment and all well materials (pipe, screen, filter fabric) were steam cleaned prior to use. A locking protective steel cover was installed at each well.

10.2 Procedures

The objectives of the second phase well program were met by locating wells near the suspected boundary of the contaminated groundwater plume (to define the extent of contamination) and at various locations on the site where additional hydrogeologic data was required. To assist in determining whether a well was located in a clean (outside

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10.3 Installed Well Locations

The borehole locations and final locations of the wells installed during the second phase of the well installation program are shown on Figure 3. The boring logs and well logs for these installations are included in Appendicies A-2 and B, respectively. Well construction details are summarized in Table 1.

detailed in Section 8.0 of this report were followed.

Wells P-8, P-18, P-19, P-20 and P-21 were located, based on the OVA measurements taken during their installation, outside the contaminant plume on the first drilling

attempt. Wells P-10, P-11 and P-12 had to be moved to a second location before the OVA measurements indicated they were outside the plume. After these wells were installed and groundwater samples were obtained and subjected to laboratory analyses, volatile organics identified in Wells P-10 and P-18 indicated that these wells are contaminated rather than being uncontaminated as indicated by OVA testing of the auger cuttings.

Wells P-14 and P-17 were also planned to have been installed outside the plume. Access to Well P-14 was very difficult because of wet, soft ground and there was no reasonably accessable alternative location at the time of installation. Thus, Well P-14 was installed even though the OVA data indicated contamination. Well P-17 was also planned to have been installed outside the plume. However, after being relocated the soil boring showed significantly higher contamination than the first boring closer to the plume. Therefore, a well was installed and completed to a depth of 20 feet below the ground surface.

The locations for Wells P-6, P-7, P-9, P-13, P-15, and P-16 were established for purposes other than being outside the suspected contaminant plume so the OVA was not used to analysis the cuttings as these wells were drilled. Well P-6 was installed upgradient of the plume to obtain background data. Well P-7 was installed within the staging area used during the initial clean-up to investigate for possible contamination. Wells P-9, P-13, P-15 and P-16 were located to provide additional hydrogeologic and contaminant data. It should be noted that initial attempts to install Wells P-15 and P-22 were unsuccessful due to the "running sand" characteristics of the soil. The sand would bind in the annulus between the auger and the well pipe thus making it impossible to remove the auger without pulling the well pipe out also. Well P-15 was installed about 100 foot from its initially planned location and Well P-22 was installed about 25 feet from its initially planned location.

Well development was accomplished with a surge block and a 1.7-inch hand pump. Developed wells were surged two to three times with about 80 gallons of water being removed from most of the wells. Many of the wells have silted slightly, probably because of the finer-grained material within the upper portion of the aquifer. The last four wells installed (P-19, P-20, P-21, and P-22) were not developed because of anticipated siltation and time restrictions. The details of the well development are presented on the monitoring well logs in Appendix B.

10.4 Second Phase Sampling

10.4.1 General

The second phase sampling program was completed in two stages similiar to the second phase well installation program as described in Section 10.1. During the first stage of the sampling, conducted in September 1985, water samples were obtained from Wells BP-1 through P-16, W-8, W-9, and W-10. Samples were also collected from Myers Creek (the first surface water downgradient of the site) at the location shown on Figure 3. The second stage of the sampling was conducted in December 1985 and consisted of obtaining water samples from wells BP-3-1, and BP-5 through P-22. Because the initial sampling program (Section 8) indicated the chemicals compounds in the groundwater were primarily volatile organics, samples collected in the second phase sampling program were typically analyzed only for volatile

organics. Details on the sampling procedures and results from both samplings are presented in the following subsections.

10.4.2 Sampling Procedures

The following step-by-step procedure was used to obtain samples from wells P-6 through P-22 for volatle organic analysis:

- The wells were inspected for damage or evidence of inadvertent entry. Any such evidence was noted on the Sample Collection Form.
- The water level sounding probe and bottom five feet of cable was rinsed three times with distilled water. The depth to the water surface in the well from the top of PVC casing was then measured and recorded.
- 3. The stainless steel bailer was rinsed with acetone followed immediately with a triple rinse using distilled water. New rope was installed on the bailer.
- 4. The volume of water in one well bore volume was calculated and the well was purged by removing 2 bore volumes from the well. The flow of water was directed into a five-gallon container to measure the volume of water removed. Two bore volumes were considered adequate well purging since all of these wells had sand packs formed from all in-situ materials.
- 5. After purging the well and recording the volume removed, a bottom feed bailer was lowered slowly into the well. The bailer was then slowly removed from the well and the water from the bailer was poured into a 40 ml clear glass sample vial. This process was repeated for a duplicate sample. When recovering a sample care was taken not to aerate the sample and the sample vial was filled completely so there was no entrapped air.
- 6. The vials were labeled immediately and placed on ice in a cooler.

- 7. The bailer was again lowered into the well to obtain a sample of water to measure and record temperature, ph, and specific conductance. Three replicate measurements were made of these parameters. The ph/conductivity meter and thermometer were triple rinsed with distilled water prior to use.
- 8. The Sample Collection Form was completed. All equipment used for sampling was rinsed with distilled water and the bailer rope discarded. The cap was placed on the well and the protective cover locked.

Additional samples were obtained from Well P-6 during the first stage of sampling to further define the background water quality of the surficial aquifer. These samples were collected in four amber glass I liter bottles. Three of the bottles were filled with water directly from the bailer and one was filled with water from a bailer that was filtered using a peristaltic pump and an in-line 0.45-micron filter. The filtered sample was preserved with 5 milliliters of nitric acid for metals analysis.

Samples from Wells BP-1 through BP-5 were obtained by using 1/4 inch tubing and compressed nitrogen to raise the water to the ground surface from the small diameter piezometers. Each of these wells consists of several piezometer tips. An attempt was made to obtain a 40 milliliter sample from each tip. In Wells BP-3, BP-4, and BP-5 one of the piezometer tips consists of a 2 inch PVC pipe with a screened section at the bottom. These tips were sampled with a bottom feed stainless steel bailer using the same procedures employed to sample Wells P-6 through P-22.

The sample for volatile organic analysis from Myers Creek was obtained by holding a sample vial just below the water surface so it filled slowly and with a minimum of turbulance. The vial was then held upright below the water to assure there would be no entrapped air.

In December 1985, Well BP-3, tip 1 was sampled in an attempt to determine if there were any non-aqueous phase liquids (NAPL) present in the lower portion of the surficial Such liquids, if present, would tend to sink to the bottom of the aquifer since the compounds at Bluff Road are denser than water. Well BP-3, tip I was chosen for sampling because the screen penetrated 0.9 feet into the Black Mingo clay, thus forming a "cup" where NAPL's might collect if present. This well was sampled on December 22, A 1/4 inch tube was inserted to the bottom of the A peristaltic pump was then attached to the top of the tube and used to draw about 40 ml into the 1/4 tube. The top of the tube was then sealed and the tube removed from the well. A 40 mil glass sample vial was then filled with the fluids in the bottom of the tube. Two sample vials were filled in this manner, then stored in a location where no mixing or shaking would occur. After several days both samples were examined to determine if they had separated into one or more phases or if non-aqueous phase "droplets" were suspended in the water. None of these effects were observed and it was concluded that the samples did not contain any non-aqueous phase liquids.

As part of the quality assurance program, trip blanks were prepared and several field blanks were also taken during each stage of sampling. Two trip blanks of distilled water were prepared by the laboratory prior to sampling and accompanied the samples at all times. These trip blanks

served as checks on the procedures used by the chemical lab to clean the sample vials. In addition two blanks were prepared by pouring distilled water from the bailer (after cleaning) into a vial to determine whether there was any residual contamination from other wells or the cleaning process. During the first stage of sampling a third blank was obtained by running distilled water through the peristaltic pump and filter apparatus into a vial. analysis of these blanks showed that the concentration of volatile organic compounds was below the Method Detection Limit in all blanks. This shows that the sampling procewere sufficient and apparatus to prevent cross-contamination of samples.

10.4.3 Analytical Results

Results of the chemical analyses on groundwater samples from the second phase sampling are presented in Appendix E. The results of the volatile organic analyses are summarized in Table 2.

Monitoring well P-6 was installed up-gradient of the site and represents background water quality in the surficial aquifer. Samples from well, P-6 had pH values of 5.4 and 6.1, and specific conductance values of 76 and 85 umhos/cm at 25°C, in September and December respectively. No volatile, acid or base/neutral organic compounds were detected at a detection limit of 5.0 ppb. No pesticides or PCB's were detected at a detection limit of 1.0 ppb. All trace metal concentrations were below the detection limit of 0.01 ppm. The cyanide concentration was less than the detection limit of 0.02 ppm. Total phenol was less than the detection limit of 0.10 ppm. A sample from well P-6 collected by SCDHEC on October 11, 1985 did show traces of four volatile organic compounds at concentrations between 3 ppb

and 8 ppb. These results are also reported in Appendix E. Thus background water is characterized as having specific conductance of less than 100 umhos/cm, slightly acidic, and no detectable trace metal contaminants, and generally no organic compounds at concentrations above 5 ppb.

The wells which showed the most contamination in the second phase sampling were P-10, P-13, P-14, P-16, BP-1, BP-3 and BP-4. These wells had total volatile organic concentrations ranging from 4403 ppb to 45,295 ppb and concentrations of some individual volatile organic compounds typically in the hundreds or thousands of parts per billion. Monitoring well P-9 had a lesser degree of contamination with concentrations of individual compounds were between the MDL and 191 ppb.

The list of volatile organic compounds most commonly found in the groundwater is essentially the same as those determined during the Spring sampling (Section 8). The following compounds were most often found in the highest concentrations typically above 1000 ppb:

Chloroform Tetrachloroethylene

1,1-Dichloroethylene Toluene

1,1-Dichloroethylene 1,1,1-Trichloroethane

Methylene Chloride Trichloroethylene

1,1,2,2-Tetrachloroethane

Although present in some wells at concentrations above 1000 ppb in the Spring, 1,2-Trans-Dichloroethylene was not detected in any of the samples obtained during the second phase sampling. Wells P-19, P-20, P-21, and P-22 were installed to define the leading edge of the contaminant plume. These wells were sampled in December, 1985. Wells

P-19, P-20, and P-21 had no volatile organic contaminants above the MDL. P-22 was closer to the source than P-19, P-20, and P-21, and had 249 ppb of methylene chloride and 36 ppb of carbon tetrachloride. Methylene chloride is a relatively mobile contaminant and likely indicated the leading edge of the contaminant plume. No volatile organic compounds were detected in the samples collected from Myers Creek.

A few wells, P-7, P-17, and P-18, showed signs of contamination that were outside the suspected boundaries of the plume. These will be discussed below.

During the initial phases of site clean-up, two locations adjacent to the SCR&D facility was designated as a staging areas for drum removal. One of the staging areas was the Campbell's Garage property, and the other was located just northwest of the site. Monitoring Well P-7 was installed to determine the groundwater quality in the northwest area. In the September sampling, volatile organics detected in water from this well included chloroform, tetrachloroethylene, 1,1,1 trichloroethane, 1,1,2 trichloroethane and trichloroethylene and concentrations between 1,048 ppb and 33 ppb. In the December sampling, concentrations of all of these compounds decreased. The December concentrations were between 400 ppb and below the MDL. Complete results are reported in Table 5 and Appendix E.

During the installation of monitoring Well P-17, an OVA reading of 40 ppm was recorded, strongly indicating ground-water contamination. When complete, this well had a strong organic sulfur odor. Samples were collected November 19, November 26 and December 4. In the first sampling no vola-

tile organics were detected above the MDL. In the second sampling toluene, 1,1,1 trichloroethane and trichloroethylene were detected in concentrations of 419, 605 and 60 ppb, respectively. In December, concentrations of 27 ppb chloroform, 19 ppb of 1,1,1 trichloroethane and 12 ppb of trichloroethylene were detected.

Monitoring well P-18 was sampled twice in December. Volatile organic compounds similar to those found in the leachate plume were detected. These included carbon tetrachloride, chloroform, 1,1 dichloroethylene, 1,1,2,2 tetrachloroethane, tetrachloroethylene, 1,1,1 trichloroethane, 1,1,2 trichloroethane and trichloroethylene in concentrations from 456 ppb to 32 ppb.

11.0 PUMPING TEST

In December 1985 a pumping test was conducted in the surficial aquifer at the Bluff Road Site. The purpose of the test was to better determine the hydraulic conductivity of the surficial aquifer with a higher degree of confidence than could be obtained using the results of grain size analyses of soil samples.

The pumping well used for the test, Well O-1, is located about 800 feet from Bluff Road in the vicinity of Wells P-8 and P-9. The pumping rate during the test was 102.7 gallons per minute and was maintained for about 23 hours. Water levels in monitoring wells within approximately 500 feet of the pumping well were monitored throughout pumping and for approximately 24 hours after the cessation of pumping. Water level measurements in individual monitoring wells were used to calculate the hydraulic conductivity of the surficial aquifer and the results are reported in Table 3. The average hydraulic conductivity calculated using pumping test results was $3.4 \times 10^{-2} \text{ cm/sec.}$ Samples of the well discharge were collected and analyzed for priority pollutant volatile organic compounds. A complete description of methods, data collected, analysis, and results of the pump test is included as Appendix H of this report.

12.0 TREATABILITY STUDIES

Laboratory treatability studies have been conducted on contaminated soil and groundwater samples collected at the Bluff Road site. The purpose of these studies was to obtain data pertaining to the effectiveness of aeration in removing contaminants from groundwater and of spray irrigation in leaching contaminants from soil.

The effectiveness of aeration was evaluated by subjecting a sample of contaminated groundwater to vigorous aeration over a period of time. Water samples were periodically taken from the aerator and tested for volatile organic compounds. The results of these tests show that the concentration of volatile organic compounds in the test sample was decreased 90% by 45 minutes of vigorous aeration. A complete description of the test methods and results is included as Appendix J of this report. These results indicate that aeration should be strongly considered as a part of the remediation system at this site.

Spray irrigation is a potential remedial measure which might be used to remove contaminants present in the on-site This method would soils above the groundwater table. involve spraying water onto the ground surface so that this water would infiltrate through the unsaturated on-site dissolving chemicals present in the soil, "flushing" the chemicals into the groundwater where they would be collected and treated along with the contaminated This "flushing" process was modeled in the groundwater. laboratory by percolating water through an undisturbed sample of soil from the site. The outflow from the soil was periodically tested for volatile organic compounds so that the time rate of leaching could be determined. Tests on two soil samples resulted in an observed reduction in leached volatile organic compounds of 66%. Appendix J contains a complete description of the methods and results of the leachability tests. These results indicate that spray irrigation should also be strongly considered as a part of the remediation system at this site.

13.0 SITE SPECIFIC STRATIGRAPHY

13.1 Topography

The study area is located in a flat low lying area between South Carolina Highway 48 (Bluff Road) and Myers Creek (Figure 3). Bluff Road, which bounds the southwest side of the study area, is a local topographic high. The land west of Bluff Road slopes toward the west, draining into the Congaree River and Mill Creek. The land east of Bluff Road, which includes the study area, slopes gently eastward toward Myers Creek, a tributary of the Congaree River. Wooded land outside the former facility boundary commonly has ponded water in many areas for several days after a heavy rainfall. Property east of Myers Creek drains westward back into the creek. Myers Creek flows through a broad, swampy area where soft soils and standing water is common.

In the study area several drainage ditches influence local drainage. The location of these ditches has been reported by EPA and SCDHEC (References 1 and 2). One ditch noted in these previous investigations extends from the vicinity of the on-site lagoon southward past Well P-17 toward Bluff Road.

13.2 Stratigraphy

The type, depth, and extent of soil strata present at, and adjacent to, the site have been inferred using the results of the field investigations, laboratory tests, and results of previous investigations on and near the site (References 1, 2, 4). The soil profile at the site generally consists of a sandy soil approximately 50 feet thick underlain by a stiff gray clay at least 10 feet thick. Beneath the clay lies a layer, approximately 50 feet thick,

of interbedded clay and clayey sands. This is underlain by fine to medium sands of the Middendorf Formation. More detailed discussions of the characteristics of each of these strata are presented in the following sections and illustrated on Figure 7.

13.2.1 Surficial Strata

The surficial sand layer was investigated more extensively than the other strata with a total of 50 borings being made. The borings indicate that within about 15 feet of the ground surface there is considerable variation in soil characteristics both horizontally and vertically. Below a depth of about 15 feet nearly uniform conditions were observed throughout the site.

Borings east of Well BP-5 indicate that brown clay or silty clay with a trace of fine sand extends from the ground surface to a depth of between 6 feet and 17.5 feet. Where the silty clay thickness is less, there is typically a transition zone of fine sand with silty clay extending to about 15 feet. Borings P-17, P-18, P-19, and T-10 differ slightly, indicating a layer of brown sand and clay to a depth of between 9.0 feet and 14.5 feet. This layer has only a slightly lower percentage of fine particles than that found in the other borings, thus supporting the general trend that, west of Well BP-5, the soil is generally fine grained to a depth of about 15 feet. The results of grainsize analyses conducted on representative samples of this soil are reported in Table 4 and Appendix F.

The borings west of, and including, BP-5 indicate soils within 15 feet of the ground surface are primarily fine sand with some silt or silty clay. Borings BP-1 through BP-4 and ST-6 through ST-19 indicate that the sand with some silty

clay is restricted to a layer beneath the former SCR&D facility. This layer varies in depth, but is about 8 feet deep at the fence line nearest Bluff Road and slopes upward to an apparent outcrop along a line from BP-4 to BP-2. Soil above and below this layer is typically a fine sand with some silt extending to a depth between 12.5 feet and 15 feet. Other soils east of BP-5 are generally fine sand with some silt extending to a depth of between 6.4 feet and 15 feet. Typical samples were selected for grain-size analysis and the results are presented in Table 4 and Appendix F.

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Below a depth of approximately 15 feet all borings encountered similar conditions. A strata of tan fine to coarse sand with little to trace silt was observed beginning at depths between 6 feet and 17.5 feet. This strata tends to become coarser and contain less fines as depth increases. The strata terminated at depths ranging from 40.0 feet to 52.0 feet where the stiff, gray clay of the Black Mingo Formation was encountered. Representative samples of this strata were selected for grain-size analysis. The analysis results, reported in Table 4 and Appendix F, indicate that the strata is very uniform and extends laterally across the entire area studied.

13.2.2 Deep Strata

The deep strata at the site, the Black Mingo and Middendorf Formations, were investigated by three borings, DW-1, DW-2, and DW-3. The Black Mingo Formation was fully penetrated and found to contain four separate units. The Middendorf Formation was only penetrated 17.5 feet.

The upper portion of the Black Mingo is a very stiff, light gray to black clay at least 10 feet thick and which appears to be both continuous and homogenous across the

study area. This clay layer is underlain by about 50 feet of interbedded layers of fine to medium sand with some silty clay or silt and silty clay with fine sand. This lower interbedded zone is underlain by gray stiff silty clay with a trace of sand. This stiff silty clay layer was encountered in borings DW-l and DW-3. However, only DW-l fully penetrated the layer, encountering a 17 foot thickness.

The Middendorf Formation, which constitutes the regional water supply aquifer, was encountered only in Well DW-1. A fine to medium sand with trace to some silt was encountered at a depth of 126.5 feet and extended to a depth of 143.5 feet. At this depth a hard white silty clay with a little sand was encountered. Boring DW-1 was terminated at a depth of 144 feet.

14.0 SITE HYDROGEOLOGY

14.1 Hydrostratigraphy

There are two aquifers present within the study area. The saturated portion of the surficial sand comprises the uppermost aquifer. The deeper sands present in the lower Black Mingo and Middendorf Formations constitute at least one confined aquifer. The layer of gray clay present at a depth of about 50 feet to 60 feet serves as an aquitard and restricts groundwater flow between the deeper confined aquifers and the surficial unconfined aquifer.

14.2 Piezometric Levels

Water level measurements were made in the monitoring wells several times during 1985, and are summarized in Table 5. Measurements made in surficial aquifer wells have been used to define the position of the water table, or piezometric surface, in the surficial aquifer. A contour map representing the piezometeric surface of the surficial aquifer in December 1985 is presented in Figure 8. This shape of this piezometric surface is typical of those observed at the site by Golder Associates throughout 1985 although the absolute values vary corresponding to wet and dry seasons.

Figure 8 also shows the direction of groundwater flow in the surficial aquifer to be east, toward Myers Creek. This is in the direction of local topographic relief. The horizontal hydraulic gradient, or slope of the piezometric surface, is approximately 0.0050 to 0.0028 in the vicinity of the site, and flattens out in the direction of flow to about 0.0007 near well P-19. It is anticipated that the gradient flattens out even more as flow approaches Myers Creek. It is also possible that during the wet season

increased rainfall may flatten the piezometric surface and reduce the horizontal hydraulic gradient. However, Golder Associates has not, to date, observed any flattening or reduced gradients associated with rainfall.

The installation of some multi-level piezometers in the surficial aquifer allowed the calculation of vertical gradients. The two multi-level piezometers furthest west, BP-1 and BP-3, exhibited strong downward gradients. vertical gradients in BP-1 were 0.015 and 0.011 in January and April 1985, respectively. In BP-3, the vertical gradients were 0.014 and 0.015 in April and September 1985, respectively. Eastward in the direction of groundwater flow, at BP-2 and BP-4, the downward vertical gradients were less strong. For BP-2, the vertical gradients were 0.006 in February 1985 and 0.003 in April 1985. For BP-4 the vertical gradient was 0.005 in both April and September 1985. The presence of downward vertical gradients in the vicinity BP-1 through BP-4 indicates that there is a downward component of groundwater flow in the surficial aquifer At BP-5, the bundled piezometer furthest in this area. along the flow path, the vertical hydraulic gradients were negligible, indicating essentially horizontal flow.

The piezometric levels in the lower confined aquifer were approximately five feet below the levels in the surficial unconfined aquifer. The resulting downward gradient across the Black Mingo clay aquitard, computed between the screens in Wells BP-2 and DW-1, is approximately 0.08. This gradient indicates that, given enough time, groundwater from the surficial aquifer will flow through the Black Mingo clay into the underlying confined aquifer. The direction of horizontal flow in the confined aquifer was not determined

by this investigation. However, investigators at the Westinghouse Electric Corporation Plant report that flow in the aquifer is toward the south (Reference 4).

14.3 Hydraulic Conductivity

The hydraulic conductivity of several of the strata were determined using field and laboratory test results. Hydraulic conductivity in the surficial aquifer was calculated using the results of grain size analyses and a 24-hour field pumping test. The permeability of the Black Mingo clay and the underlying strata were determined by laboratory permeability tests.

In the surficial aguifer the results from the pump test analysis indicate a hydraulic conductivity ranging from 2.4 \times 10⁻² cm/sec to 7.0 \times 10⁻² cm/sec. Using Hazen's approximation and the results of grain size analyses, the hydraulic conductivity was estimated to be between 3.6×10^{-2} cm/sec and 22 x 10^{-2} cm/sec. The pump test provided an averaged value over the entire aguifer thickness at the well while Hazen's approximation determined a hydraulic conductivity value for the discrete interval sampled. In instances where values were calculated from both methods at a single well, the agreement between the two methods was very good provided the well screen interval and the depth of sample for grain size analysis were consistent. For Wells P-13, P-15, and BP-1 the agreement between the two methods was only fair, with Hazen's approximation resulting in a hydraulic conductivity five to ten times greater than that calculated from the pump test. For these wells, hydraulic conductivity values from Hazen's approximation may have been biased to a slightly higher number due to problems with running sand encountered during drilling and sampling. The sampling spoon often had to be washed down the hole to the

desired sampling depth. This may have washed out some of the fine grained particles from the sample, making the resulting sample slightly coarser than the in-situ soil. Also, the surficial aquifer tended to become coarser with depth. Most of the grain size samples for Hazen's approximation were collected from deeper portions of the strata which likley resulted in greater hydraulic conductivities.

All of the hydraulic conductivities calculated for the surficial aquifer are summarized in Table 3. The values resulting from the pumping test analysis is considered the most reliable determination because the test measured the response of a large volume of undisturbed soil. Therefore, a hydraulic conductivity for the surficial aquifer of 4 x 10^{-2} cm/sec is considered representative of aquifer conditions.

The hydraulic conductivity of the black, plastic clay which underlies the surficial aquifer was determined in the laboratory. Two undisturbed samples of this clay were back-pressure saturated in a triaxial chamber after which water was forced to flow through the samples. The tested hydraulic conductivities were 9.4 x 10^{-9} cm/sec and 8.6 x 10^{-8} cm/sec. These values, along with the results of other soil tests on this sample, is reported in Table 4.

14.4 Groundwater Flow Velocities

Average groundwater velocities were calculated using the Darcy equation adjusted for effective porosity:

$$v = \frac{ki}{n_e}$$

where

v - average linear groundwater velocity

k - hydraulic conductivity

i - hydraulic gradient

n - effective porosity

Using a value of 4 x 10⁻² cm/sec for hydraulic conductivity, an assumed effective porosity of 0.35 and gradients of 0.0050, 0.0028 and 0.0007, average linear groundwater velocities of 56 feet per month, 32 feet per month, and 8 feet per month, respective to gradients, were calculated. These values represent the range of groundwater velocities which have been observed at the site. During wet seasons it is possible the velocities may decrease if rainfall results in lower hydraulic gradients. To date, no such lower gradients have been observed by Golder Associates.

Using a hydraulic conductivity of 5×10^{-8} cm/sec for the hydraulic conductivity of the aquitard, a gradient of 0.08, and assuming an effective porosity of 0.2, the average linear flow velocity which might be expected across the aquitard would be approximately 2×10^{-3} feet per month.

14.5 Flow Regime

Two flow regimes exist at the site which are somewhat independent of each other. Although specific data was not collected for the deeper confined aquifer, regional information suggests flow in a south or southeast direction towards the Congaree River. A more localized groundwater flow pattern exists for the uppermost aquifer. Near Bluff Road, a local topographic high, and in the vicinity of the former SCR&D site vertical gradients are downward indicating a local recharge zone. Near BP-5 the vertical gradients are negligible indicating flow has become primarily horizontal. It is anticipated that local discharge occurs in the marshy area near Myers Creek.

15.0 CONTAMINATION ASSESSMENT

15.1 Soil Contamination

A review of the results of investigations by EPA and Golder Associates indicates that the unsaturated soil within the former boundaries of the SCR&D facility is contaminated with volatile organic chemicals and metals. These contaminants constitute a continuing source of chemicals which can leach into the groundwater. Golder Associates investigation suggests that the contaminated area extends from Bluff Road in a northeast direction to the former fence line at the rear of the facility, and appears to be bounded by the former fence lines which run perpendicular to Bluff Road. In February 1986, Golder Associates learned from SCDHEC that the Campbell's Garage property had been used as a staging area during initial phase of the site cleanup and that some drums of chemicals were spilled here during the cleanup. Also, surface runoff from the former SCR&D facility does corss a portion of the Campbell's Garage property. fore, it is likely that this property is also contaminated.

Within the contaminated area, the contamination extends from the ground surface to a depth of at least 15 feet. Soil contamination is believed to extend down to at least the water table within the former SCR&D facility boundaries. Analysis of a composite soil sample for priority pollutants indicates that the only compounds detected in the soil are volatile organics and metals. Analysis of 18 individual soil samples for volatile organics indicates that five compounds frequently present are:

Benzene

Chloroform

Methylene chloride

Toluene

1,1,1 Trichloroethane

The observed concentration of volatile organic compounds varied from the Method Detection Limit to 23,465 parts per billion (ppb). However, due to the difficulties in testing soils for volatile organics discussed in Section 5.1, the absolute levels of organic contaminants indicated by test results may not be as high as actual in situ concentrations.

Test results on the composite soil sample indicated the possible presence of phenols in the soil. Since phenols were also observed in a groundwater sample taken from Well BP-3, it therefore seems likely that phenols are also present in at least a portion of the unsaturated soils. Concentration of metals in the composite sample varied from the Method Detection Limit to 7.0 parts per million (ppm). Four metals, selenium, zinc, copper, and chromium, were present at concentrations greater than 0.1 ppm.

15.2 Lagoon Contamination

Golder Associates investigation indicates that the water present in the on-site lagoon did not contain any priority pollutant organic compounds at the time of sampling. Samples were taken in January and November of 1985 thus suggesting that surface runoff from the former SCR&D facility into the lagoon is not presently contributing measurable organic contamination to the lagoon water. Tests on six water samples collected in January 1985 indicated that some metals are present in the water. In particular, the concentrations of copper, arsenic, and chromium vary 0.5 ppm to 10.6 ppm. The analyses indicate that, at the time of investigation, the water in the on-site lagoon was not contaminated with priority pollutant organic compounds.

The sediments in the bottom of the existing lagoon were also sampled by Golder Associates, in January 1985. sediments appeared to be lime and likely remain from the acetylene manufacturing operation formerly conducted on the property. The sediment had a pH of 11.5, as would be expected with lime. Analysis of a composite sediment sample priority pollutants indicated the presence of organic compounds, ethylbenzene (23 ppb) and napthalene (18 Metals present in the largest concentration were magnesium and sodium. Some priority pollutant metals were present but at concentrations less than 20 ppm and include copper, arsenic, zinc, chromium, lead, nickel, and beryl-Therefore, the analyses indicate that the lime sediments in the bottom of the existing lagoon are slightly contaminated. These contaminants are primarily metals.

15.3 Above-ground Tank

The above-ground tank is located on-site just inside the fence near Bluff Road and contains a highly toxic sludge. The sludge consists of 33,300 ppm of 2-chlorophenol and 13,774 ppm of phenol. Several other acid and volatile compounds were detected in much lower concentrations. Golder Associates has been informed by an industrial hygienist that the compounds present in the tank are at such high concentrations that direct dermal contact with the sludge would pose an immediate danger to life and health. We also understand that short-term exposure to the vapors emanating from the tank poses a health hazard. Therefore, the tank is considered to be highly contaminated and should be removed from the site.

15.4 Groundwater

15.4.1 Surficial Aquifer Contaminant Plume

The extent of contaminated groundwater in the surficial aquifer has been determined using the results of chemical analyses on water samples obtained from the monitoring wells in 1985. These analyses indicate that a plume of contaminated groundwater extends from the site toward the east approximately 2300 feet. The plume is about 1000 feet wide. The plume of contaminated groundwater is, as expected, migrating in the direction of groundwater flow. Well P-6, upgradient of SCR&D facility, does not indicate contamination, the analyses clearly show that the former SCR&D facility is the source of the contamination. probable source of contamination is chemicals spilled on the ground surface and chemicals remaining in the soil within the former facility boundaries. The contaminant plume present in the surficial aquifer in September and December, 1985 is shown on Figures 9 and 10, respectively. The extent of contaminated groundwater is indicated by the total concentration of volatile organic compounds present in the The concentration and extent of individual groundwater. chemical compounds has also been examined. Although some differences exist, the extent of contamination indicated by the total volatile concentration is consistent with most of the individual compound contaminant plumes.

Figures 9 and 10 indicate two zones of highly contaminated water. One zone is at the source of groundwater contamination, the SCR&D site. The second zone is located approximately 1000 feet downgradient and is centered about monitoring wells P-14 and P-16. The chemical composition of the two zones is very similar, indicating that the zone centered about P-14 and P-16 has migrated from the site and constitutes a plume of contaminated groundwater.

The first zone of highly contaminated groundwater is located at the former SCR&D facility where the total concentration of all volatile organic compounds is typically around 10,000 ppb. Concentrations as high as 45,295 ppb have been observed in Well BP-1. Individual volatile organic compounds are present in concentrations typically in the hundreds or thousands of parts per billion. Volatile organic compounds frequently present are:

Chloroform	Methylene Chloride
l,1 Dichloroethane	Toluene
l,l Dichloroethylene	Tetrachloroethylene
1,1,2,2 Tetrachloroethane	1,1,1 Trichloroethane
Trichloroethylene	

A priority pollutant scan on a sample collected in the Spring of 1985 from a highly contaminated well (BP-3, tip 3), revealed three phenolic acids and three chlorinated benzenes in concentrations from 4 ppb to 281 ppb in addition to volatile organic compounds. No trace metals were detected in this sample. The analysis results indicate that the primary groundwater contaminants were volatile organic compounds.

The second zone of highly contaminated groundwater, centered about Wells P-14 and P-16, typically has total volatile organic concentrations between 11,366 ppb and 21,618 ppb. The individual compounds frequently present are similar to those present around the former SCR&D facility and typically have concentrations in the hundreds or thousands of parts per billion.

Between the two highly contaminated zones, there is an area in the vicinity of Wells BP-5 and P-15 of apparently lower contamination. Total volatile organic concentrations present in the groundwater are typically 100 ppb to 1100 ppb. The individual compounds present in the wells in this areas are, however, similar to those present in the highly contaminated zones. There are two possible explanations for this area of apparently low concentration.

is possible that the lower concentrations are evidence of a relatively narrow, high permeability "corridor" that extends from the former SCR&D site to the vicinity of Wells P-14 and P-16. This high permeability corridor, if it exists, apparently by-passes Wells BP-5 and P-15. subsurface conditions noted at Boring T-6 indicates the possible existence of a high permeability corridor. P-15 was originally to be located at the site of Boring T-6 but severe problems with running sands flowing up inside the hollow stem auger drill stem prevented the installation of the well at this location. Running sands are often indicative of sand with a very low percentage of fine particles and are usually highly permeable. Also, the results of the soil gas survey (Figure 6) indicated a narrowing of the plume of contaminated soil gas in the area between Wells BP-5 and P-15. Finally, the existence of a high permeability zone is not inconsistent with the environment under these soils were deposited. Water deposition frequently results in variations in soil deposits over short distances. Therefore, it is possible that the zones of highly contaminated groundwater are not two separate zones but are possibly connected by a high permeability corridor which is likely to contain contaminant concentrations similar to those in the highly contaminated zones but not directly measured by the monitoring wells.

A second possible explanation suggests that the area of low concentration reflects groundwater flow that has occurred since the site cleanup in 1982 and 1983. Such flow might exhibit lower concentrations of chemicals since leaking drums were no longer present at the site. Using this explanation, the area of high concentration around Wells P-14 and P-16 could be a slug of contaminants due to excessive leakage of waste chemicals during the facility operation and cleanup. This explanation is consistent with estimated groundwater flow velocities provided that leakage from the site was significant from about 1979 until the Spring of 1983.

The leading edge of the plume, downgradient (east) of Well P-16 was investigated by the installations of Wells P-19 through P-22. Wells P-19, P-20 and P-21 had no contaminants at concentrations above the MDL. Well P-22 showed concentrations of 249 ppb of methylene chloride and 36 ppb of carbon tetrachloride. Methylene chloride is a relatively mobile contaminant and likely indicated the leading edge of the contaminant plume.

15.4.2 Contamination Outside the Plume

During the initial phases of site clean-up, an area was designated as a staging area for drum removal. Monitoring Well P-7 was installed to monitor the groundwater in this area. In September and December, 1985 volatile organics were detected in water sampled from this well at concentrations between the MDL and 1,048 ppb. Because this area is up-gradient of the site, and because it was used as a staging area during site clean-up, this contamination is not believed to be part of the contaminant plume emanating from the site. The actual zone of contaminated water monitored

in this well is expected to be very local to the well. However, because the well is up-gradient of the SCR&D facility, the flow of contaminated groundwater will be through the site where it will join the contaminant plume.

Samples from Monitoring Well P-17 were shown to be contaminated with organic compounds similar to those found in the downgradient contaminant plume. The total concentration of volatile organic compounds, as indicated by three samples, varied from the MDL to 1089 ppb. However, the contamination of groundwater at this location is not considered to be part of the downgradient plume. Monitoring Well P-12 lies between the site and Well P-17. Well P-12 had 60 ppb of tetrachloroethylene in the September sampling, no volatile organic contaminants were detected above MDL by the December sampling. Consequently, Well P-12 is believed to be clean. It is possible, but unlikely that contamination could reach Well P-17 without also being detected at Well P-12. A more likely reason for the contamination at Well P-17 would be the drainage ditch that runs from near the site to the Well P-17 area. Contaminated surface water could have flowed down this ditch to the vicinity of Well P-17 where it infiltrated into the Another possible source of contamination is Bluff Road itself. A spill along the roadway in the vicinity of Well P-17 could account for the contamination. Additional investigation in this area is recommended.

Monitoring Well P-18 was found to be contaminated with the volatile organic compounds which were commonly found in the contaminant plume. The total concentration of volatile organics was between 1000 ppb and 1500 ppb. Although a finger of contaminated groundwater migrating from the site to Well P-18 is possible, it is unlikely that this is the

case. The well itself is not down-gradient from the site and lies roughly 1000 feet from the center line of the plume in a direction roughly perpendicular to the direction of groundwater flow. Also, wells BP-2 and P-8 are located between the site and Well P-18. Both these wells are essentially clean. Although at this time the relationship is only speculative, a logging road does run near this well, and may be potentially related to its contamination. Additional investigation in this area is recommended.

15.4.3 Deep Strata

The deep strata present in the study area consist of the Black Mingo and Middendorf Formations. The strata were penetrated by Wells DW-1, DW-2 and DW-3 which were screened below the clay layer present at the top of the Black Mingo Formation. Groundwater samples collected from these wells in the Spring of 1985 did not detect any volatile organic Therefore, the strata being monitored are currently considered to be uncontaminated. Further, the clay layer at the top of the Black Mingo Formation is apparently present throughout the study area and significantly restricts, but does not totally prevent the downward flow of contaminated groundwater. However, the major water supply aquifer of the Middendorf Formation is not considered to be in jeapordy of contamination from the former SCR&D site at this time.

Stiff

Hard

Very stiff

LIST OF ABBREVIATIONS

The abbreviations and terms commonly employed on each Boring Log, on the Figures, and in the text of the report, are as follows:

С	-	Coarse	RES	-	Residual
CA	-	Casing	RX	-	Rock
F	-	Fine	SA	-	Sample
FRAG	-	Fragments	SAT	-	Saturated
M	-	Medium	SM	-	Some
MIC	-	Micaceous	TR	-	Trace
NP	-	Non-plastic	WL	-	Water level
PH	-	Pressure hydraulic	WH	-	Weight of hammer
PM	-	Pressure manual			

TERMS AND DESCRIPT	TIONS	SAMPLE TYPES
Soil Description	Range of Proportion	AS Auger Sample
		CS Chunk Sample
Trace (tr.)	0 - 5%	DO Drive Open
Little	5 - 12%	DS Denison sample
Some	12 - 30%	PS Pitcher sample
And	30 - 50%	RC Rock core
		ST Slotted tube
		TO Thin-walled, open
		TP Thin-walled, piston
		WS Wash sample
Relative Density		
of Cohesionless So	oils N (blows/ft.)	SOIL TESTS
Very loose	0 to 4	C Consolidation test
Loose	4 to 1 0	CD Consolidated drained triaxial
Compact	10 to 30	CU Consolidated undrained triaxia
Dense	30 to 50	H Hydrometer analysis
Very dense	over 50	M Sieve analysis
		MH Sieve & hydrometer analysis
		U Unconfined compression
		UU Unconsolidated undrained triax
		V Vane Shear
Consistency of		
Cohesive Soils	Cu (psf)	PENETRATION RESISTANCE
Very soft	less than 250	Standard Penetration Resistance,
Soft	, 250 to 500	"N" = the number of blows required
Firm	500 to 1,000	to drive a 2 in. OD splitspoon
		3.40.35

1,000 to 2,000

2,000 to 4,000 .

over 4,000°

sampler one foot using a 140 lb.

hammer falling 30 in-

LIST OF SYMBOLS

I. GENERAL

 $\pi = 3.1416$

e = base of natural logarithms 2.7183

log, a or ln a, natural logarithm of a

logio a or log a, logarithm of a to base 10

t time

g acceleration due to gravity

V volume

W weight

M moment

F factor of safety

II. STRESS AND STRAIN

u pore pressure

σ normal stress

σ' normal effective stress (σ̄ is also used)

7 shear stress

e linear strain

er shear strain

Poisson's ratio (μ is also used)

E modulus of linear deformation (Young's modulus)

G modulus of shear deformation

K modulus of compressibility

7 coefficient of viscosity

III. SOIL PROPERTIES

(a) Unit weight

y unit weight of soil (bulk density)

7. unit weight of solid particles

γ unit weight of water

va unit dry weight of soil (dry density)

y' unit weight of submerged soil

G. specific gravity of solid particles $G_{i} = \gamma_{i}/\gamma_{in}$

e' void ratio

n porosity

w water content

S, degree of saturation

(b) Consistency

v. liquid limit

wp plastic limit

IP plasticity index

ws shrinkage limit

 I_L liquidity index = $(w - w_P)/I_P$

 I_c consistency index = $(w_L - w)/I_P$

emax void ratio in loosest state

emin void ratio in densest state

D, relative density = $(e_{max} - e)/(e_{max} - e_{min})$

(c) Permeability

h hydraulic head or potential

q rate of discharge

v velocity of flow

i hydraulic gradient

k coefficient of permeability

j seepage force per unit volume

(d) Consolidation (one-dimensional)

m, coefficient of volume change

 $= -\Delta e/(1+e)\Delta \sigma'$

 C_c compression index = $-\Delta e/\Delta \log_{10} \sigma'$

c. coefficient of consolidation

T, time factor = $c J/d^2$ (d, drainage path)

U degree of consolidation

(e) Shear strength

τ, shear strength

c' effective cohesion

intercept

in terms of effective

effective angle of } stress

shearing resist- $|\tau_f = c' + \sigma' \tan \phi'$

ance, or friction

cu apparent cohesion*

 ϕ_w apparent angle of shearing resistance, or friction in terms of total stress $\tau_f = c_w + \sigma \tan \phi_w$

u coefficient of friction

S, sensitivity

*For the case of a saturated cohesive soil, $\phi_{\mathbf{z}} = 0$ and the undrained shear strength $\tau_f = c_{\mathbf{z}}$ is taken as half the undrained compressive strength.

16.0 SUMMARY

Golder Associates has completed a Remedial Investigation at the former South Carolina Recycling and Disposal (SCR&D) facility on Bluff Road south of Columbia, South Carolina. Previous investigations of this facility were conducted by the U.S. Environmental Protection Agency (1980) and the South Carolina Department of Health and Environmental Control (SCDHEC) (1981). Wastes at the site were removed during 1982 and 1983, partly under the provisions of the Comprehensive Environmental Response and Liability Act (Superfund). Golder Associates, under contract to SCDHEC, began investigating the type and extent of soil and groundwater contamination at the facility in November, 1984. These investigations have been completed and the findings, presented in this report, are summarized below.

Golder Associates has investigated the soil and lagoon conditions within the former SCR&D facility boundaries, and the groundwater conditions within and adjacent to the facility. These investigations show that there are six soil strata present at and near the facility. The uppermost layer, approximately 15 feet thick, is a fine sand with some silty clay or silt that becomes a silty clay with fine sand in the eastern portion of the study area. Below this lies a layer, approximately 35 feet thick, of fine to coarse sand with a trace of silt. This relatively clean sand has a hydraulic conductivity of approximately 4×10^{-2} cm/sec and is the uppermost aquifer in the study area. The water table is encountered at a depth of about 5 feet to 10 feet below the ground surface. Flow in the study area is toward the east with gradients between 0.0050 and 0.0007. The estimated groundwater flow velocity is between 56 feet/month and 8 feet/month. The clean sand is underlain by about 10 feet of gray to black plastic clay. Lab testing indicates that

this clay has a hydraulic conductivity of about 5 x 10^{-8} cm/sec. Therefore, the clay layer is effective in retarding the downward movement of groundwater.

The plastic clay is underlain by three other deeper strata. The first is an interbedded sand and silty clay approximately 50 feet thick. This is underlain by another gray silty clay layer about 15 feet thick. The deepest layer is the a fine to medium sand with some silt of the Middendorf Formation. This deepest layer is a confined aquifer used for water needs throughout the Columbia region.

Contamination assessments were made using the results of field observations and analyses on the above ground tank, soil, lagoon water, and groundwater samples. analysis indicates that the above-ground tank contains highly toxic sludge consisting primarily of 2-Chlorophenol and Phenol. Contact with this sludge would pose an immediate danger to life or health. Soil contamination was indicated in each of eighteen borings made within the former facility boundaries and between the facility and Bluff Road. These borings suggest that on-site soil between the ground surface and the water table contains a number of volatile organic compounds. Water samples were taken from the on-site lagoon in both January and November 1985. Both samples indicated that volatile organic compounds were not present in concentrations above the Method Detection Limit.

The extent of contaminated groundwater was investigated by installing 25 monitoring wells and drilling 10 additional test borings for organic vapor analysis. Three of the monitoring wells are screened in deep strata which underlie the black plastic clay. Analysis of water samples collected

from these deep wells in March, 1985 indicates that volatile organic compounds are not present above the Method Detection Limit below the clay aguitard.

The 22 wells installed in the surficial sand aquifer indicate that chemical compounds are present throughout the thickness of the aquifer and are moving in the direction of groundwater flow. Analysis of water samples from Well BP-3, tip 3, for priority pollutants indicates that the compounds present in the groundwater are almost entirely volatile organics. The concentration of any individual volatile organic compound ranges from the Method Detection Limit to 10,328 parts per billion (ppb). The total concentration of volatile organic compounds ranges from the Method Detection Limit to 45,295 ppb. The area where groundwater presently contains volatile organics lies east of the former SCR&D facility and is approximately 2300 feet long and 1000 feet wide. The plume tends to become wider at greater distances from the facility. The data also indicates that the background water quality does not contain volatile organic compounds in concentrations above the Method Detection Limit.

Based on the information obtained during our Remedial Investigation, Golder Associates recommends the following:

1. Conduct a Feasiblity Study to evaluate and select remedial measures for use at this site. Because of the rapid groundwater movement in the surficial aquifer this study should be completed as soon as possible.

REFERENCES

- U.S. Environmental Protection Agency; Groundwater and Surface Water Investigation, South Carolina REcycling and Disposal, Inc., Bluff Road Site, Columbia, South Carolina, July 1980
- South Carolina Department of Health and Environmental Control; Investigation of Groundwater at South Carolina Recycling and Disposal Company, Bluff Road Site, Richland County, South Carolina; 1981
- McNeil, J.D. "Electrical Conductivity of Soils and Rocks," Geonics LTD Technical Note TN-5, 1980
- 4. Soil & Material Engineers, Inc.; Groundwater Hydrology at Westinghouse Electric Corporation Plant, Richland County, South Carolina; Report No. H8119, 1982

- Measure the depth to groundwater in each monitoring well monthly to determine seasonal variation in water table.
- 3. Analyze groundwater samples from Wells BP-1, BP-4, BP-5, P-7, P-8, P-10, P-13, P-14, P-16, P-19, P-20, P-21 and P-22 at least semi-annually for volatile organic compounds.
- 4. Conduct additional investigations to determine the source and extent of contamination in the vicinity of Wells P-17 and P-18. These investigations may include additional borings, monitoring wells, soil and water sampling, determination of prior land use, or interviews with persons familiar with activities which have occurred in the area. The investigation of the area surrounding Well P-18 is especially important since, at present, there is no reasonable explanation for this contamination.

GOLDER ASSOCIATES

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Principal

MTF:JEB:mrs

January 1986

TABLE 1
SUMMARY OF
MONITORING WELL DATA

MELL Number	GROUND ELEVATION (ft msl)	PVC COLLAR. ELEVATION (ft bsl.)	DEPTH OF SCREEN (ft.)	DEPTH OF OPEN INTERVAL (ft msl)
BP 1	138.3	140.09	SEE LB6	8.0 - 50.0
BP 2	137.2	139.18	SEE LOG	5.5 - 49.0
BP 3	137.5	138.33	SEE LOG	8.0 - 49.0
BP 4	134.9	135.90	SEE LOG	7.5 - 45.0
BP 5	137.7	140.20	SEE LOG	8.0 - 48.5
P 6	140.2	143.08	7.1 - 47.6	5.2 - 49.0
? 7	139.9	142.70	4.7 - 45.2	4.0 - 46.5
P 8	138.8	141.25	9.3 - 49.3	6.0 - 51.5
P 9	138.5	141.32	9.3 - 49.8	6.5 - 51.0
P 10	139.2	142.30	7.9 - 48.4	5.5 - 51.5
P 11	137.9	140.87	9.0 - 49.5	7.0 - 51.5
P 12	135.9	139.37	6.0 - 46.5	4.0 - 50.0
P 13	139.6	142.69	8.9 - 49.4	3.0 - 51.5
P 14	138.7	141.67	9.5 - 50.0	6.5 - 51.5
P 15	137.6	140.53	8.1 - 48.6	6.0 - 49.7
P 76	138.5	141.38	10.6 - 51.1	4.5 - 51.1
P 17	134.2	137.39	7.0 - 17.5	5.7 - 19.0
P 18	139.2	141.98	10.0 - 50.0	7.4 - 52.3
7 17	137.7	140.95	7.5 - 44.6	3.5 - 50.5
P 20	137.0	139.95	16.8 - 44.8	10.0 - 50.0
P 21	137.7	141.67	8.0 - 48.0	6.0 - 49.2
7 77	137.8	141.715	14.3 - 48.8	9.5 - 51.5
DN 1	136.9	139.4	90.5 - 109.5	88.0 - 115.
DW 2	137.3	140.3	72.5 - 91.5	59.0 - 95.0
DE 3	137.4	139.7	78.5 - 117.5	94.0 - 120.

#ill 88-3 WELLEP-3 WELL BP-4 BELL BA-2 Will BP ? #ELL 89-4 WELL BP-5 WELL BP-5 WELL BP-1 HELL 67-1 *:4 1HPU 2E* 4-SAMPLES 4-SAMPLES "SA THRU 50" 2-SAMPLES 4-SAMPLES "3A IHRU 3D" "4A THRU 4D" 8-SAMPLES "IA THRU IG" 25-Azr-\$5 .5-Apr-85 1 - Sep-85 19-Sep-95 25 -Apr -85 19-Sep-6: 19-Sep-85 **VOLATILE ORGANIC COMPOUNDS** 27-Mar-85 18-500-85 27-Mar-85 -----(deal 1000) 10001 (aph) 1000) (ppb) (pob) (ppb) (ppb) (ppb) ACRULETA () i - I1 (] (1 ACRITORITRICE < 1 (1 (1 . 1 () 5.19 58 105 51 Mil Hi 20 821 161 . 1 BIS (CHEOROMETHYE) ETHER (-1)(1 ŧ 1 1 $\chi = I$ \ 1 BRONOFORM (1 (1 i 1 < 1 () CARBON TETRACHLORIDE 0.1 1109 (1 430 40 CHEGROBEN!ENE 61 41 29 445 (1 $\langle I \rangle$ (1 CHLBRODI-BAONOMETHANE < 1 < 1 : 1 () CHLORGETHANE ϵ_{I} < 1(1 (1 (1 2-CHLORGETHYLVINYL ETHER (1 $\langle 1 \rangle$ (1 (1 () CHIBROTOPM 179 414 113 877 1774 84 3 DICHLOROBRONOMETHANE (1 < 1 < 1 (1 11 DICKLORODIFLUORGMETHAKE (1 (1 (1 (1 (1 1.1-DICHLORDETHAME 78 380 705 1 1 1 (1 (1 65 1.2-DICHLORDETHANS 278 (1 (1 < 1 () 1,1-DlibLordETHYLEME 129 6827 69 107 1499 152 < 1 1.2-DICHLOROPROPAWE (1 (1 () (1 () 1,2-DICHLOROPROPYLENE $\langle 1 \rangle$ (1 (1 (1 (1 ETHYLBENZENE 7 149 (1 110 55 411 78 20 HETHYL BROWIDE **(1** (1 () $\langle 1 \rangle$ (1 METHYL CHLORIDE (1 (1 < 1• < 1 METHYLENE CHLORIDE 3298 10093 1 102 3005 5 1,1,2,2-TETRACHLDROETHAME 190 10328 387 43 (1 11 1510 219 S TETRACHLORDETHYLENE 234 5028 < 1 67 571 823 555 174 146 7 TOLUENE 199 2416 495 250 31 348 (1 8 4 1,2-18AHS-DICHLORDETHYLEHE 1596 (1 243 2 326 I.I.I-TRICHLORDETHANE 163 4462 4644 1503 7974 3745 4232 20 (1 8 1,1,2-TRICHLOROETWANE (1 (1 22 450 uTRICHLOROETHYLENE 1163 4496 31 1362 1213 875 86 93 < 1 1 RICHLOROFL WORD METHANE (1 · 1 . i 1 (1 **(1 ~**--VINYL CHLORIDE (1 (1 i l< 1 (12 *IF PRESENT, LESS THAN 5 ppb. FIELD NEASUREMENTS 5.8 5.9 5.0 6.3 5.0 4.2 5.2 4.8 SPECIFIC COMDUCTIVITY 65 85 80 110 110

TABLE 2 SUMMARY OF VOLATILE ORGANIC AFALYSES ON GROUNDWATER

TABLE 2 SUMMARY OF VOLATILÉ ORGANIC ANALYSES ON GROUNDWATER (CONTINUED)

					,					
VOLATILE DEGAMIC COMPOUNDS	WELL BP-5 3-SAMPLES 10-Dec-85	WELL P-6 10-3ep-85	WELL P-0 03-Dec-85	WELL P-7 10-Se0-85	WELL P-7 US-Dec-85	#221 P-6 16-380-85	#211 P-8 04-bec-85	WELL P-9 17-Se0-85	WELL P-9 US-Dec-35	WELL P-10 17-sed-85
	(pab)	(pph)	1900)	(00b)	(200)	(226)	(poh)	(dag)	(pph)	(pab)
ALFOELIW				•		•		•		• •
ACPILONITRILE		•		•		•		•		•
BURZUKU	5	•	•	•	*		•	•	•	
BIS (CHEOROMETTIE) ETHER	•	•	•	•	•	•	•	•	•	*
BRONDFORM		•	,	•	•	•	•			•
CARBON TETRACHLORIDE	15			•	•	•	•	•	•	
CHLOROBERZENE	•	•	•	b	1	•	•	•	•	•
CHIORODI-BROMOMETHANE	•	•		•	•	•	•		•	•
CHIDRDETHANE	•	•	•	5	,	,		•		•
2-CHLORDETHYLVINYL ETHER				,	,)			,	•
CHLOROFORM	•	•	•	409	93	,		115	119	2719
DICHLOROBRONOMETHANE	1	•	•	•	•	•	•	•	•	•
DICHLORODIFLUOADMETHAME			•	•			•		•	
1.1-DICHLORGETHAME	231		,	,	•				114	2152
1,2-DICHLORDETHANE	91						•		+	•
1,1-DICHLORDETHYLEME	473	•	•	•	•	•	•	136	169 .	1152
1,2-DICHLOROPROPANE					•					
1,7-DICHLOROPROPYLENE			•				·			
ETRYLDENZENE			•							67
METNYL BROWIDE	•	•	•		•	•	i	•	•	•
METHYL CHLORIDE		4								
METHYLENE CHLORIDE	7		i			•	•			1973
1,1,2,2-TETRACHLOROETHANE		•		•		•	•			902
TETRACHIORDETHYLENE	11			105	ì	5		42	27	430
TOLUENE	35		_				_	_	•	123
1,2-TRANS-DICHLORBETHYLENE	,,			•	•	•		*	9	122
I I I-TOICHIMANETHANE	101	,			400	•	•	191	8 7	
O 1.1.2-TRICHLORDETHANE	30			104 8 33	10	;		58	42	1654
TRICHLOROETHYLENE	10			504	7.5				~	. 70
	18		•	591	73	18	•	29	25	679
VINKI CHIDAIDE	·	•	•		•	•	•	•	•	•
	•	•	•	•	•	•	•	,	•	•
O IS PRESENT, LESS THAN 5 ppb.	•									
FIELD BEASUREHENTS										
OBSCIETA CONDUCTIVITY	6.1	5,4	6.1	5.0	5.3	5.1	5.2	5.2	6.0	5.6
SPECIFIC COMPUCTIVITY		76	85	115	90	105	90	130	120	185

TABLE 2 SUMMARY OF VOLATILE ORGANIC ANALYSES ON GROUNDWATER (CONTINUED)

	VOLATILE DEGAMIC COMPOUNDS	WELL P-10 U5-Dec-85	HELL P-11 16-Sep-95	WELL P-11 03-Dec-85	WELL P-12 Te-Sep-85	WELL P-12 U4-Dec-85	WELL P-13 17-Sep-85	WELL P-13 05-Dec-95	RELL P-14 17-Sep-85	üELL P-14 to-Tec-95	WELL P-15 17-5ep-85
-		(pat)	(pph)	(opb:	(pot'	100b1	(ppb)	(\$96)	(ppb)	(000)	(076)
	CPOLETK		•		•		•		•		•
	CRILONITRILE		•		•		•				•
	EHZEHE	•	•	•	•	•	23	9	•	•	•
6 1	IS (CHLOROMETHIL) ETHER	•	•	•	•	•	•	•		•	•
84	RONOFORN	•	•	• .	•	•		•	. •		•
(4	ARBON TETRACHLORIDE	1280	•	•	•	•	•	•	•	883	•
î H	HLOROBENZEWE	•	1	•		•	•	•	•	40	•
CH	HIORODI-BROMOMETHANE	•	•	*	•	•	•	•	•	•	•
<i>(</i> H	HLDROETHANE	•					•	•	•		
1-	-CHLOROETHYLYINYL ETHER	a .	•	•		•				•	
()	HLDROFDRN	3425						2063		3776	
	1CH LOROBROMONETHANE	•	•	•	•	•	1699	•	,	•	•
л	PICHLORODIFLUORGHETHANE	•									
	DICHLORDETHANE	1208	·			•	1393	491	167	•	
	1,2-DICHLDRSETHANE	1,00	•	•	·	•	1373	=	101	•	•
	1.1-DICHLORDETHYLENE	119	•	•	Ţ	į	928	* J26	2216	70	111
		_	_								
	1,2-D1CHLOROPROPANE	•	•	•	•	•	•	+	•	•	•
	1,2-DICHLOROPROPYLENE		,	•	,	•	•	,	•	•	•
	ETHYLBENZENE	59	•	•	•	•	48	*	•	46	•
л	METHYL BROWIDE	•	•	*	•	•	•	•	•	•	•
	TETHYL CHLORIDE	•	•		•		•	4	•	•	•
	ETHYLENE CHLORIDE -	2008	•	•	•	•		•	2986	2921	•
	,1,2,2-TETRACHLORDETHANE	600	•	•	•	•	•	75	636	824	•
	FTRACHLOROETHYLENE	241	•	•	40	•	146	95	423	•	43
00 11	OLUENE	94			,	,	177	13	178	542	
	, 2-TRAHS-DICHLORDETHYLEHE		•	•		•		•	•	+	
\bigcirc 1,	. 1.1-TRICHLORGETHANE	1863		•			986	1192	2102	7335	49
O 1,	,1,2-TRICHLORDETHAKE	•	•	•	•	•	•	•	•	34	•
1R	RICHLORDETNYLENE	469	•				191	148	188	469	
	RICHLOROFLUOROMETHAME	•					*	•	100	*	
	INYL CHLORIDE	•		•	•	•	•	•		•	•
0											
• /	«IF PRESENT, LESS THAN 5 ppb.										
111	ELD HEASUREHENTS										
ρН		4.5	5.5	5 /							
	ECIFIC COMDUCTIVITY	6.0 175	120	5.6 65	5.1 95	5.2 75	6.0	5.9	5.6	5.5 340	5.3 70
37 6		112	1.10	ر ۵	¥2	/ 3	180	130	27¢	J#U	10

TABLE 2

SUMMARY OF VOLATILE ORGANIC ANALYSES ON GROUNDWATER (CONTINUED)

				100	DNTINUED)					
VOLATILE DREAMIC COMPOUNDS	WELL P-15 05-Dec-95	WELL P-16 17-Sep-85	WELL P-16 05-Dec-85	WELL P-17 19-Mov-85	WELL P-17 26-Nov-85	WELL P-17 04-Dec-85	WELL P-18 04-Dec-85	WELL P-18 21-Dec-85	WELL P-19 06-Dec-95	WELL P-20 04-Dec-35
	(ppb)									
ACROLEIN			***							-
ACRILOMITRILE										
BENZENE		348			5	,				
BIS (CHLOROMETHYL) ETHER								1		
BRONDFORM										
CARBON TETRACHLORIDE							293	1	,	
CHLOROBEMZENE										
CHLORODI-BROMOMETHANE					•					
CHLORDETHANE										
2-CHLORDETHYLVINYL ETHER	1									
CHLOROFORM			3797	4		27	217	180		
DICHLOADBROMONETHAME										
DICHLORODIFLUOROMETHANE										
1,1-DICHLOROETHANE		922	467							
1,2-DICHLORGETHANE		2155								
1.1-DICMLOROETHYLEME		4828	926			1	168	188		
1,2-DICHLOROPROPANE										
1,2-DICHLOROPROPYLENE										
ETHYLBENZENE		223								
METHYL BROWIDE										
METHYL CHLORIDE										
METHYLENE CHLORIDE			5238							
1,1,2,2-TETRACHLOROETHANE		1825	756				61	91	1	,
) TETRACHLOROETHYLENE	23	1993	540				166	115		
TOLUENE		1351	357		419			,		
1,2-TRANS-DICHLORDETHYLENE										
1,1,1-TRICHLORDETHANE	103	5943	3714		605	19	456	404		
) 1,1,2-TRICHLOROETHANE							46	39		
TRICHLORDETHYLENE	11	2130	022		60	12	32	31		
TRICHLOROFLUOROMETHAME								- 1		
- VINYL CHLORIDE	•									
*IF PRESENT, LESS THAM 5 ppb.										
FIELD MEASUREMENTS										
pH	5.7	5.1	0.0			5. J	5.4		6.0	
SPECIFIC CONDUCTIVITY	90	480	550			00	115		375	6.1
										110

TABLE 2
SUPMAPY OF
VOLATILE ORGANIC ANALYSES ON GPOUNDWATER
(CONTINUED)

VOLATILE ORGANIC COMPOUNDS	WELL P-21 11-Dec-35	WELL P-22 06-0ec-85	HELL W-8 13-Sep-35	WELL W-9 17-Sep-85	18-Sep-25	WELL DW-1 27-Mar-35	WELL DM-2 27-Mar-85	WELL DW-3 27-Mar-95
	(ppb)	(ppb)	(ppb)	(000)	(000)	(ppb)	(ppb)	(ppb)
ACROLEIN	:	~	•	•	•	(1.0	(1.0	(1.0
ALRILONITRILE			•	ŧ	•	(1.0	(1.0	(1.0
BLNZENE	•	•	1	•	•	(1.0	← 1.0	(1.0
BIS (CHLOROMETHYL) ETHER	•	•	•	ŧ	•	(1.0	(1.0	⟨ 1.0
BRONOFORM	•	•	•	•	•	(1.0	{ 1.0	1 1.0
CARBON TETRACHLORIDE	•	36	•	ŧ	•	(1.0	(1.0	(1.0
CHLOROBENZENE	•		•	•	•	(1.0	(1.0	(1.0
CHLORODI BRONOMETHANE	•	•	•	•	•	(1.0	(1.0	(1.0
CHLORDETHANE	•	•	•	•		(1.0	(1.0	`(1.0
2-CHLORDETHYLVINYL ETHER	•	•	•	•		(1.0	(1.0	(1.0
CHLOROFORM	•	•	•	•	,	(1.0	(1.0	(1.0
DICHLOROBRONORETHANE	•	•	•	•	•	(1.0	(1.0	⟨1.0
DICHLORODIFLUOROMETHANE					•	< 1.0		
1,1-DICHLOROETHANE	•			i	i	(1.0	< 1.0 < 1.0	1.0
1.2-DICHLOADETHANE			•		i	(1.0		(1.0
I, I-DICHLORDETHYLENE	;	•	•	•	i	(1.0	; 1.0 < 1.0	(1.0 (1.0
1,2-D1CHLOROPROPANE		•						
1.7-DICHLORDPROPYLENE					·	< 1.0	(1.0	(1.0
ETHYLBENZENE	•		•			(1.0	: 1.0	(1.C
METHYL BROWIDE	•	*		i	•	< 1.0 < 1.0	(1.0 (1.0	(1.0 : 1.0
METHYL CHLORIDE		_					,	
METHYLENE CHLORIDE	•	*	•	,	•	⟨ 1.0	1.0	(1.0
	•	249	•	•	•	(1.0	: 1.0	1.0
1.1,2,2~1ETRACHLOROETBAKE TETRACHLOROETBYLENE	•	•	•	,	•	(1.0	(1.0	(1.0
TETRACALURUETATLESE	•	1	•	•	•	(1.0	(1.0	(1.0
TOLUENE	•		•	,		(1.0	(1.0	
1.2-TRANS-DICHLORDETHYLENE	•			•	·	(1.0	. 1.0	(1.0
1.1.1-TRICHLORDETHANE		,			•	₹ 1.0	. 1.0	(1.0
1,1,2-TRICHLORDETHANE	•	•	•	•	•	(1.0	(1.0	(1.0 (1.0
TRICHLOROETNYLENE	4		•		•	, (A		
TRICHLOROFLUORONETHANE			•	i		(1.0	(1.0	().0
VINYL CHLORIDE	•	•	•	•	į	(1.0 (1.0	1.0	(1.0
*IF PRESENT, LESS THAN 5 gab.								
FIELD NEASURENENTS								
e ii	6.7	5.9	5.2	5.2	5.7	5.0	3.5	1.0
SPECIFIC CONDUCTIVITY		οÚ	195	45	185			

TABLE 2

SUMMARY OF VOLATILE ORGANIC ANALYSES ON GROUNDWATER (CONTINUED)

VOLATILE ERGANIC COMPOUNDS	"MYERS CREEK" 27-Mar-85	19-500-85
	(ppb)	ipobi
ACRGLEIN	(1.0	•
ACRILOHI1FICE	(1.0	•
BENJENE	(1.0	•
BIS (CHLOROMETHYL) ETHER	(1.0	•
BRONOFORM	(1.0	•
CARBON TETRACKLORIDE	(1.0	•
CHIOROBEWZEWE	(1.0	•
CHI GRODI-BRONONET WANE	(1.0	•
CHLOROETHANE	(1.0	•
2-CHLOROETHYLVINYL ETHER	(1.0	
CHLORDFORM	(1.0	•
DICHLOROBRONDMETHANE	< 1.0	•
DICHLORODIFLUORDNETHANE	(1.0	
1.1-DICKLORDETRANE	(1.0	
1,2-DICHLORDETHAME	(1.0	•
1,1-BICHLORGETHYLERE	(1.0	•
1,2-DICHLOROPROPANE	(1.0	
1,2-DICHLORDPROPYLEHE	⟨ 1.0	,
ETHYLDENZEHE	(1.0	
METHYL BROWIDE	(1.0	4
METHYL CHLORIDE	(1.0	•
METHYLENE CULDAIDE	(1.0	•
1,1,2,2-TETRACHLORDETHANE	(1.0	•
TETRACHLOROETHYLENE	(1.0	•
TOLVEHE	(1.0	•
1,2-TRANS-DICHLORDETHYLENE	(1.0	•
1,1,1-TRICHLOROETHANE	(1.0	•
1,1,2-TRICHLORDETHANE	(1.0	•
TRICHLORDETHYLENE	(1.0	•
TRICHLOROFLUOROMETHANE	(1.0	•
VINYL CHLORIDE	1.0	•

*IF PRESENT, LESS THAN 5 ppb.

FIELD MEASUREMENTS

pH	5.6	4.8
SPECIFIC CONDUCTIVITY		70

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TABLE 3 SUMMARY OF HYDRAULIC CONDUCTIVITY VALUES

Well No.	Sample	Depth (ft.)	Hydraulic Conductivity (cm/sec)	Method of Analysis
BP-1	Sa-8	18.5-20.0	6.8×10^{-2}	Hazen
BP-1	Sa-11	33.5-35.0	22.0×10^{-2}	Hazen
BP-1	-	45.0-47.5	3.2×10^{-2}	Pump Test
BP-2	Sa-11	38.5-40.0	3.6×10^{-2}	Hazen
BP-2	• -	45.0-47.5	3.1×10^{-2}	Pump Test
BP-3	Sa-11	28.5-30.0	18.0×10^{-2}	Hazen
BP-4	Sa-10	33.5-35.0	6.3×10^{-2}	Ha zen
BP-4-1	-	38.7-43.7	3.2×10^{-2}	Pump Test
BP-5	Sa-7	18.5-20.0	4.0×10^{-2}	Hazen
BP-5-1	-	40.0-47.5	3.1×10^{-2}	Pump Test
P-7	-	4.7-45.2	7.0×10^{-2}	Pump Test
P - 8	-	9.3-50.0	3.5×10^{-2}	Pump Test
P-9	-	9.3-49.8	3.4×10^{-2}	Pump Test
P-13	Sa-9	45.0-46.5	13.0×10^{-2}	Hazen
P-13	-	8.9-50.0	2.5×10^{-2}	Pump Test
P-14	Sa-5	25.0-26.5	9.6×10^{-2}	Hazen
P-15	Sa-4	40.0-41.5	18.0×10^{-2}	Hazen
P-15	~	8.1-48.6	3.2×10^{-2}	Pump Test
w- 6	~	9.5-12.0	3.2×10^{-2}	Pump Test
₩-7	~	9.5-12.0	2.4×10^{-2}	Pump Test
w-8	-	9.5-12.0	$3.2 \times .10^{-2}$	Pump Test
W-10	-	12.0-15.0	4.6×10^{-2}	Pump Test
₩-11	-	9.5-12.0	3.0×10^{-2}	Pump Test

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TABLE 4
SUMMARY OF SOIL PHYSICAL TEST RESULTS

RORING NO.	SAMPLE NO•	SAMPLE DEPTH (FEET)	WATER CONTENT (PERCENT)	LIQUID LIMIT (PERCENT)	PLASTIC LIMIT (PERCENT)	PERCENT PASSING #200	D 10 (mm)	SPECIFIC GRAVITY	LABORATORY PERMEABILITY (cm/sec)
BP-1	8	18.5-20.0	20•2			0.9	0.260		
BP=1	11	33.5-35.0				1.1	0.470		
BP-2	4	8.5-10.0	21.8			19-2	<0.001		
BP-2	10	33.5-35.0	19-1			13.9			
BP-2	11	38.5-40.0				7.7	0.190		
BP=3	11	28.5-30.0	12.9			1.0	0.430		
BP-4	10	33.5-35.0	17.1			1.0	0.250		
BP-4	12	43.5-45.0	18.6	60	35	83.4	<0.001		
RP-5	7	18.5-20.0	21.3			2.2	0.200		
BP-5	11	38-5-40-0	19.9						
P-8	9	45.0-46.5				20.9	0.041		
P-13	3	15.0-16.5				14.2	0.040		
P-13	9	45.0-46.5				0.9	0.360		
P-14	5	25.0-26.5				1.8	0.310		
P-16	3	49.5-50.9	26.1	60	31	100.0	<0.001	2.59	9.4×10^{-9}
P-22	4	18-5-20-0				48.0	<0.001		
P-22	5	28.5-30.0				16.9	<0.001		
DW-1	7	103.0-104.5	18.3			18.3	0.003		
DW-2	7	84.0-85.0	24.0			34.0	<0.001		_
DW-3	1	58.0-60.0	29.0	26	17	94.7	<0.001	2.62	8.6×10^{-8}
DW-3	4	110.0-110.5				2.1	0.420		
T-6	4	40.0-41.5				0.6	0.420		

TABLE 5

SUMMARY OF PIEZOMETRIC DATA

DEPTH TO GROUNDHATER FROM TOP OF PVC CASING

							L	ELIE IO ONO	(57)					
		AUG CACING	GROUND	EEPTH OF OPEN					(FT)					
		PVC CASING		INTERVAL										
		ELEVATION	ELEVATION		14-11-4-94	74-1an-95	11-100-95	21-106-85	27-feb-85	14-Mar-95	15-Mar-85	20-Mar-85	27-Har-85	28-496-82
1	WELL #0.	(F7-#SE)	ci7-MSL)	(61)	14-14-1-64	. 4 Van 05	15 / 11 05							
				12 2 22 2	13.07	13.34							10.82	
	¥-}	142.75	140.6	17.0-22.0		7.20							5.40	
	- -6	135.93	135.3	9.5-12.0	7.10								5.63	
	V = 2	135.95	135.5	9.5-12.0	7.23	7.29							5.84	
	v 8	136.31	135.7	9.5-12.0	7.58	7.60							4.08	
		135.61	135.1	9.5-12.0	6.13	6.33							5.10	
	A-0		135.5	12.0-15.0	7.13	7.37							4.95	
	₩~10	136.45		9.5-12.0	6.98	6.85							4.73	
	¥-11	135.39	135.0	7.5 11.0										
	BP-1 8(UE-ORG	140.06	130.7		•						8.65			
		140.06	138.2	10.0		11.05	11.50				8.55			
	BP-1 BLUE-YLW		138.7	14.0		11.05	11.60							
	BP-1 BLACK	140.06		17.0		11.10	11.50				8.60			
	8P : RED	140.06	138.2			11.10	11.50				8.60			
	BP-1 BROWN	140.06	138.2	74.0		11.10	11.60				8.60			
	BP-1 YELLOW	140.06	138.7	29.0			11.70				8.75			
	BP-1 GFEEN	140.06	138.7	34.0		11.30					9.80			
	BP-1 BLUE	140.06	138.2	39.0		11.45	11.80				8.80			
		140.06	138.2	44.0		10.35	11.80				9.00			
	RP-1 DRANGE		138.7	46.5		11.60	11.90				7.00			
	BP-1 SCREEN	140.06	130											
	BP-2 BLUE-YLW	139.13	137.1	7.5				11.40	8.90	9.15	9.15	9.15		
	BP-2 BLACK	139.13	137.1	12.5										
	BP - 2 RED	139.13	137.1	17.5				11.40						
		139.13	137.1	22.5				11.35						
	6P-2 BROWN		137.1	27.5				11.30						
	BP-2 YELLOW	139.13	137.1	12.5				11.30	8.87					
	BP-2 GREEM	139.13		37.5				11.25	9.85					
	BP-2 BLUE	139.13	137.1					11.25	9.85	9.15	9.0			
	BP-2 ORANGE	139.13	137.1	42.5				11.20		9.00	9.10	9.10)	
2	BP-2 SCREEN	139.13	137.1	45.0										
φ														
\circ	87 · 3-4	138.50	137.5	10.2-17.7										
	BP-3-3	138.50	137.5	19.7-28.7										
\circ		130.50	137.5	33.7-38.9										
	BP-3-2		137.5	43, 3-49, 3										
-	BP-3-1	138.50	131.3	13,3 10,0										
\bigcirc	BP-4-4	136.00	135.0	10.0-15.0										
	BP-4-3	136.00	135.0	16.5-21.5										
		136.00	135.0	27.5-37.5			•							
	8P-4 2		135.0	39.7-43.7										
2	BP-4-1	136.00	131.0	Ju										
	BP-5-4	140.20	137.7	10.4-15.0										
	BP-5-3	140.20	137.7	17.5-22.5								•		
			137.7	27.6-35.1										
	BP-5-2	140.20	137.7	40.0-47.5										
	BP-5-!	140.20	13/+/	70.0										

SUMMARY OF PIEZOMETRIC DATA (CONTINUED)

3

(CONTINUED) DEPTH 13 GROWNDHATEF FROM TOP OF PYC CASING

	out tactut	6 ROUND	DEPTH OF OPEN	DEBLA 12 PPORUNNIEN FROM ION OF LAZING										
	PVC CASING ELEVATION	ELEVATION (FT-HSL)	THERNAL -177	14-Dec-94	M - Jan - 85	11-144-05	27.fah-85		14:827-35	25-Mar-95	20-Mar -85	27 - Mar - 95	29 - Mar - 85	
WELL MU.	(FT-MSL)	(11-101)	.,,,	14 (6) 04	. 4 (40 (7)	13 146 93	21 / 40 65	71 741 63	27 118. 05	13 1.3, 03	10 1107 00	17		
ř-8	143.08	140.2	5.2 - 49.0											
ρ-!	147.70	139.9	4.0 - 46.5											
P - 8	141.25	118.7	b.0 - 51.5											
F-0	141.32	138.5	6.5 - 51.0											
P-11	142.30	139.2	5.5 - 51.5											
P-!1	140.97	117.9	7.0 - 51.5											
P-12	139.37	135.9	4.0 - 50.0											
P-1}	142.69	139.6	1.0 - 51.5											
P-14	141.67	138.7	6.5 - 51.5											
P-15	140.53	137.6	6.0 - 49.7											
P-10	141.38	138.5	4.5 - 51.1											
P-1;	137.39	134.2	5.7 - 19.0											
P-18	141.98	137.2	7.4 - 52.3											
P-19	140.95	137.6	6.0 - 19.7											
P - 3:3	137.95	137.6	10.0 -50.0							•			•	
P-71	141.67	137.7	6.0 - 47.2					-						
P-2:	141.15	137.8	9,5 - 51.5											
Dii-1	139.39	136.3	6.211-0.88										14.55	
D#-2	140.41	117.1	59.0-95.0									14.65		
D ii - 3	139.90	117.4	94.0-117.5										15.08	

	(CONTINUED)	DEPTH TO GROUNDWATER FROM TOP OF PVC CASING												
#*************************************		PAI CASING				(f1)								
#***		ELEVATION												
## 135.9 5.40 5.48 5.77 6.10 4.81 #*7 125.95 5.40 5.79 5.77 6.10 4.80 #*7 125.95 5.40 5.79 5.70 6.20 4.40 #*9 143.11 5.34 5.79 6.24 6.55 4.47 4.71 #**0 125.45 5.10 5.72 5.04 6.60 6.60 1.52 #**10 125.35 4.75 5.04 5.41 5.20 1.72 1.85 ##*1 126.10 1.04	MELL AD.	(FT-831)	29-Mar-85	10-Apr -85	24-Apr-85	25-Apr-85	26-Apr -85	18-500-35	Co-Dec-85	13-Dec-85	20-Dec-95			
## 135.43	u -1	147.75	10.30	11.10			11.47	11.55		8.97				
## 115.95							5.77	0.1€			4.83			
# 2							5.92	ن3. ه			4.60			
# C							6.24	5.55		4.67	4.91			
# 10							4.60	4.00			2.82			
## 1	u -1∂						5.01	5.70		J.52	3.70			
## 1								5.30		3.72				
#F-1 BIACK 140.06 8.70 8.38 9.25 #F-1 RID 140.06 8.70 8.38 9.25 #F-1 RID 140.06 8.60 8.87 9.25 #F-1 RID 140.06 8.60 8.88 9.30 #F-1 RID 140.06 8.60 8.89 9.30 #F-1 RID 140.06 9.00 8.79 #F-1 RID 140.06 9.00 8.79 #F-1 RID 140.06 9.00 8.79 #F-1 RID 140.06 9.00 9.24 #F-1 RID 140.06 #F-1 RID 140.06 9.00 9.24 #F-1 RID 140.06 #F-1 RID 140.06 #F-2 RICE 140.06 9.00 9.24 #F-2 RIDE 140.06 #F-2 RICE 140.06 9.00 9.24 #F-2 RIDE 140.06 9.00 9.26 #F-2 RIDE 140.06 9.00 9.27 #F-2 RIDE 140.06 9.00 9.20 #F-3 RIDE 140.06 9.00 9.20 #F-3-4 140.00 9.00 9.20 #F-4-4 140.00 9.20 9.20 #F-4-4 140.00 9.20 9.20 #F-4-4 140.00 9.20 9.20 #F-4-1 140.00 9.20 #F-4-2 I40.00 9.20 #F-4-2 I40.00 9.20 #F-5-2 I40.00 9.20 #F-5-4 140.00 9.20 #F-5-5 140.00 9.27 #F-5-5 140.00 9.28	BP-1 BLUE-086	140.0.												
## 140							9.35							
## 1	DF-1 BLACK	140.00	8.70				9.25							
#P-1 FARE# 140.06 8.00 8.89 9.30 #P-1 FARE# 140.06 9.00 8.99 #P-1 BARE# 140.06 9.00 9.19 #P-1 BARE# 140.06 9.00 7.24 9.55 #P-1 SCREEM 140.06 #P-1 SCREEM 140.06 #P-1 SCREEM 140.06 #P-2 BLUE-YIW 139.13 9.10 9.14 9.40 #P-2 BLUE-YIW 139.13 9.10 9.17 9.18 #P-2 PLUE-YIW 139.13 9.10 9.17 9.18 #P-2 PLUE-YIW 139.13 9.10 9.11 9.15 #P-2 PLUE-YIW 139.13 9.10 9.11 9.10 9.47 #P-2 PLUE-YIW 139.13 9.10 9.11 9.10 9.47 #P-2 PLUE-YIW 139.13 9.10 9.09 9.47 #P-2 PLUE-YIW 139.13 9.10 9.09 9.47 #P-2 PLUE-YIW 139.13 9.10 9.09 9.47 #P-3 PLUE-YIW 139.13 9.10 9.09 9.40 #P-3 PLUE-YIW 139.13 9.10 9.09 9.40 #P-3-4 139.50 7.57 7.61 7.59 7.45 #P-3-1 138.50 7.7.90 7.90 5.86 6.06 #P-4-4 139.50 7.48 7.97 8.02 7.90 5.86 6.06 #P-4-4 136.00 5.54 5.70 #P-4-2 136.00 5.55 5.70 #P-4-1 136.00 5.56 5.75 3.77 3.90 #P-5-2 140.20 10.60 10.00 11.00 9.71 #P-5-3 140.20 10.60 10.00 11.00 9.72 #P-5-5 140.20 10.60 10.00 11.00 9.72 #P-5-5 2 140.20 10.60 10.00 11.00 9.72		140.00					9.25							
## 1 691E## 140.06 9.00 8.99 ## 1 800E 140.06 9.00 9.19 9.55 ## 1 800E 140.06 9.00 9.19 ## 1 800E 140.06 ## 1 10.06 9.00 9.24 9.65 1.20 7.61 7.79 ## 1 19.11 9.10 9.14 9.40 ## 19.11 9.10 9.17 9.38 ## 1 19.11 9.10 9.11 9.35 ## 1 19.11 9.10 9.11 9.35 ## 1 19.11 9.10 9.11 9.35 ## 1 19.11 9.10 9.11 9.37 ## 2 2 646E## 139.13 9.10 9.11 9.40 ## 2 2 646E## 139.13 9.10 9.11 9.40 ## 2 3 640E## 139.13 9.10 9.11 9.40 ## 2 4 640E## 139.13 9.10 9.25 ## 2 5 640E## 139.13 9.10 9.25 ## 2 6 7.57 7.63 7.55 ## 2 7.59 7.45 ## 2 7.50 7.50 ## 2 7.50 7.50 7.50 ## 2 7.50 7.50 7.50 ## 2 7.50 7.50 7.50 7.50 ## 2 7.50 7.50 7.50 7.50 ## 2 7.50 7.50 7.50 7.50 ## 2 7.50 7.50 7.50 7.50 ## 2 7.50 7.50 7.50 7.50 7.50 ## 2 7.50 7.50 7.50 7.50 7.50 7.50 ## 2 7.50 7.50 7.50 7.50 7.50 7.50 7.50 7.50	BP-1 BROWN	140.00	9.6.				9.25							
## 1 BUT							9.30							
## 1 ORANGE 140.06														
## 1 SCREE# 140.00 9.00 9.24 9.65 1.70 7.61 7.79 ## 1 SCREE# 139.13 9.10 9.14 9.40 ## 2 BP-2 BLACK 139.13 9.10 9.14 9.40 ## 2 BP-2 RED 119.13 9.10 9.12 9.18 ## 3 BP-3 BROWN 139.13 9.10 9.11 9.15 ## 4-2 SCREEM 139.13 9.10 9.11 9.40 ## 5-2 BROWN 139.13 9.10 9.09 9.42 ## 5-2 BR-2 SCREEM 139.13 9.10 9.25 9.40 ## 5-3 BP-3 139.50 7.57 7.45 ## 5-3 139.50 7.48 7.97 8.02 7.70 5.86 6.06 ## 6-4 139.50 7.48 7.77 8.02 7.70 5.86 6.06 ## 6-4 130.00 7.48 7.77 8.02 7.70 5.86 6.06 ## 6-4 130.00 7.48 7.77 8.02 7.70 5.86 6.06 ## 6-4 130.00 5.54 5.70 ## 6-4 130.00 5.55 5.70 ## 6-4 130.00 7.48 7.97 7.08 7.71 ## 6-5 140.20 7.40 7.72 7.48 7.70 ## 7 8 9 10.71 11.00 9.71 ## 7 9 10.60 10.70 11.00 9.72 ## 7 9 10.60 10.70 11.00 9.72 ## 7 9 10.60 10.70 11.00 9.72 ## 7 9 10.60 10.70 11.00 9.40 ## 7 9 10.60 10.70 11.00 9.40 ## 7 9 10.60 10.70 11.00 9.40 ## 7 9 10.60 10.70 11.00 9.40 ## 7 9 10.60 10.70 11.00 9.40 ## 7 9 10.60 10.70 11.00 9.40 ## 7 9 10.60 10.70 11.00 9.40 ## 7 9 10.60 10.70 11.00 9.40 ## 7 9 10.60 10.70 11.00 9.40 ## 7 9 10.60 10.70 11.00 9.40 ## 7 9 10.60 10.70 11.00 9.40 ## 7 9 10.60 10.70 11.00 9.40 ## 7 9 10 10 10 10 10 10 10 10 10 10 10 10 10			9.00	9.19			9.55							
BP-2 BLUE-YLW 139.13 9.10 9.14 9.40 BP-2 BLACK 139.13 9.10 9.17 9.38 BP-2 BROWN 139.13 9.10 9.11 9.15 BP-2 BROWN 139.13 9.10 9.11 9.17 BP-2 FELLO 139.13 9.10 9.11 9.17 BP-2 FELLO 139.13 9.10 9.11 9.40 BP-2 FELLO 139.13 9.10 9.11 9.40 BP-2 CREEM 139.13 9.10 9.25 9.40 BP-2 CREEM 139.13 9.10 9.25 9.40 BP-3-4 139.50 9.11 9.05 9.11 9.40 9.70 8.03 BP-3-4 139.50 7.57 7.63 7.65 BP-3-1 139.50 7.59 7.45 BP-3-2 139.50 7.59 7.45 BP-3-1 139.50 7.59 7.45 BP-3-2 139.50 7.59 7.45 BP-3-1 139.50 7.50 7.90 5.86 6.06 BP-4-4 130.00 9.71 130.00 9.71 BP-4-2 130.00 5.56 5.70 9.40 BP-4-3 130.00 5.56 5.70 9.40 BP-4-4 136.00 5.55 5.70 BP-4-1 136.00 9.71 BP-5-3 140.70 10.60 10.70 11.00 9.71 BP-5-5 140.70 9.40														
BP-2 BLACK 139.13 9.10 9.14 9.40 BP-2 RED 119.13 9.10 9.17 9.38 BP-2 RED 119.13 9.10 9.17 9.38 BP-2 RED 139.13 9.10 9.11 9.37 BP-2 RELOW 139.13 9.10 9.11 9.37 BP-2 RELOW 139.13 9.10 9.11 9.37 BP-2 RECEW 139.13 9.10 9.09 9.42 BP-2 RECEW 139.13 9.10 9.25 9.40 BP-2 RECEW 139.13 9.10 9.25 9.40 BP-3-C SCREEM 139.13 9.10 9.25 9.40 BP-3-C SCREEM 139.13 9.10 9.05 9.11 9.40 9.70 8.03 BP-3-4 139.50 7.57 7.63 7.50 BP-3-1 138.50 7.57 7.63 7.50 BP-3-1 139.50 7.48 7.97 8.02 7.90 5.86 6.06 BP-4-4 130.00 5.54 5.70 BP-4-2 136.00 5.55 5.70 BP-4-2 136.00 5.60 5.75 3.77 3.90 BP-4-2 136.00 5.60 5.75 3.77 3.90 BP-5-4 140.70 10.67 10.68 11.00 9.77 BP-5-3 140.70 10.60 10.70 11.00 9.68	BP-1 SCREEN	140.00	9.00	9.24			9.65	i.?¢		7.61	7.79			
## 8P-2 RED 139.13 9.10 9.17 9.38 9.15 9.35 9.35 9.3	•													
\$P-7 BROWN 139.13 9.10 9.11 9.35 8P-2 YELLOW 139.13 9.10 9.11 9.37 8P-2 OKEEN 139.13 9.10 9.11 9.40 9.40 8P-2 OKEEN 139.13 9.10 9.09 9.42 8P-2 OKEEN 139.13 9.10 9.25 9.40 8P-2 OKEEN 139.13 9.10 9.25 9.40 8P-2 SCREEN 139.13 9.05 9.11 9.40 9.70 8.03 8P-3-4 139.50 7.57 7.63 7.59 7.45 8P-3-3 139.50 7.57 7.63 7.50 8P-3-1 139.50 7.48 7.97 8.02 7.90 5.86 6.06 8P-4-4 138.50 7.48 7.97 8.02 7.90 5.86 6.06 8P-4-4 138.00 5.54 5.70 8P-4-2 138.00 5.55 5.70 8P-4-2 136.00 5.55 5.70 8P-4-1 136.00 5.60 5.75 3.77 3.90 8P-5-4 140.20 10.60 10.70 11.00 9.68														
#P-2 YELLOW 139.13 9.10 9.11 9.37 #P-2 GARRIE 139.13 9.10 9.11 9.40 #P-2 RUBE 139.13 9.10 9.09 9.42 #P-2 RUBE 139.13 9.10 9.25 9.40 #P-3 SCREEM 139.13 9.10 9.25 9.40 #P-3-4 139.50 7.57 7.63 7.50 #P-3-1 138.50 7.57 7.63 7.50 #P-3-2 138.50 7.48 7.97 #.02 7.90 5.86 6.06 #P-4-4 136.00 5.54 5.70 #P-4-2 136.00 5.55 5.70 #P-4-1 136.00 5.54 5.70 #P-4-1 136.00 7.55 7.60 5.75 3.77 3.90 #P-5-4 140.20 10.60 10.70 11.00 9.71 #P-5-5 140.20 7.72 11.00 9.68														
#P-2 GREEN 139.13 9.10 9.11 9.09 9.42 9.42 8P-2 ORANGE 139.13 9.10 9.25 9.40 8P-2 SCREEN 139.13 9.05 9.11 9.05 9.40 9.70 8.03 8P-3-4 139.50 7.57 7.63 7.50 8P-3-1 139.50 7.48 7.97 8.02 7.90 5.86 6.06 8P-4-4 139.50 7.48 7.97 8.02 7.90 5.86 6.06 8P-4-2 136.00 9.70 9P-4-1 136.00 5.54 5.70 8P-4-1 136.00 5.55 5.70 8P-4-1 136.00 5.60 5.75 3.77 3.90 8P-4-6 136.00 9P-5-4 140.20 10.60 10.70 11.00 9.68														
## 139.13														
BP-2 ORANGE 139,13 9,10 9,25 9,40 9,70 8,03 BP-3-4 139,50 7,57 7,63 7,50 7,45 8,03 BP-3-3 138,50 7,57 7,63 7,50 8,00 9,00 9,00 5,86 6,06 6,06 8,00 8,00 9,00 5,86 6,06 6,06 8,00 9,00 9,00 9,00 9,00 9,00 9,00 9,00														
#P-3-4 139.50 9.11 9.05 9.11 9.40 9.70 ####################################														
#F-3-4 139.50 7.57 7.45 #F-3-3 139.50 7.57 7.63 7.50 #F-3-2 138.50 7.48 7.97 8.02 7.90 #F-3-1 139.50 7.48 7.97 8.02 7.90 5.86 6.06 #F-4-4 136.00 5.46 5.00 #F-4-2 136.00 5.54 5.70 #F-4-1 136.00 5.55 5.70 #F-4-1 136.00 5.60 5.75 3.77 3.90 #F-5-4 140.20 10.67 10.68 11.00 9.71 #F-5-3 140.70 10.67 10.68 11.00 9.72 #F-5-7 140.20 10.60 10.70 11.00 9.68														
BP-3-3 138.50 7.57 7.61 7.50 BP-3-2 138.50 7.91 7.96 7.90 BP-3-1 139.50 7.48 7.97 8.02 7.90 5.86 6.06 BP-4-4 136.00 5.46 5.40 5.50 5.50 8.00 BP-4-2 136.00 5.55 5.70 5.55 5.70 BP-4-1 136.00 5.60 5.75 3.77 3.90 BP-5-4 140.70 10.67 10.68 11.00 9.71 BP-5-2 140.70 10.60 10.70 11.00 9.68	BP-2 SCREEN	119.11	9.05	9.11			9.40	9.70			8.03			
BP-3-2 138.50 7.91 7.96 7.90 BP-3-1 139.50 7.48 7.97 8.02 7.90 5.86 6.06 BP-4-4 136.00 5.46 5.60 5.50 8.70 <td></td> <td></td> <td></td> <td></td> <td></td> <td>3.40</td> <td></td> <td></td> <td></td> <td></td> <td></td>						3.40								
BP-3-1 139.50 7.48 7.97 8.02 7.90 5.86 6.06 BP-4-4 136.00 5.46 5.60 5.70 8P-4-2 136.00 5.55 5.70 8P-4-7 136.00 5.55 5.70 3.77 3.90 BP-4-1 136.00 5.60 5.75 3.77 3.90 BP-5-4 140.20 10.71 11.00 9.71 BP-5-3 140.70 10.62 10.68 11.00 9.72 BP-5-2 140.20 10.60 10.70 11.00 9.68														
BP-4-4 136.00 5.46 5.60 BP-4-3 136.00 5.54 5.70 BP-4-2 136.00 5.55 5.70 BP-4-1 136.00 5.60 5.75 3.77 3.90 BP-5-4 140.20 10.71 11.00 9.71 BP-5-3 140.70 10.62 10.88 11.00 9.72 BP-5-2 140.20 10.60 10.70 11.00 9.68					3 40									
8P-4-3 134.00 5.54 5.70 8P-4-2 136.00 5.55 5.70 8P-4-1 136.00 5.60 5.75 3.77 3.90 8P-5-4 140.70 10.71 11.00 9.71 8P-5-3 140.70 10.67 10.88 11.00 9.72 8P-5-2 140.70 10.60 10.70 11.00 9.68	#r-1-1	113.30			7.48	7.97	8.07	7.90		5.86	6.04			
8P-4-2 136.00 5.55 5.70 8P-4-1 136.00 5.60 5.75 3.77 3.90 8P-5-4 140.70 10.71 11.00 9.71 8P-5-3 140.70 10.67 10.88 11.00 9.72 8P-5-2 140.70 10.60 10.70 11.00 9.68	BP-4-4	136.00					5.46	5.60						
BP-4-1 136.00 5.60 5.75 3.77 3.90 BP-5-4 140.20 10.71 11.00 9.71 BP-5-3 140.70 10.67 10.88 11.00 9.72 BP-5-2 140.20 10.60 10.70 11.00 9.68	87-4-3	136.00					5,54	5.70						
BP-5-4 140.2v 10.71 11.00 9.71 BP-5-3 140.70 10.67 10.68 11.00 9.72 BP-5-2 140.20 10.60 10.70 11.00 9.68	87-4-2	136.CV					5.55	5.70						
8P-5-2 140.20 10.62 10.68 11.00 9.72 8P-5-2 140.20 10.60 10.70 11.00 9.68	87-4-1	136.00					5.60	5.75		3.77	3.90			
8P-5-2 140.20 10.62 10.68 11.00 9.72 8P-5-2 140.20 10.60 10.70 11.00 9.68														
87-5-2 140.20 10.60 10.70 11.00 9.60														
7,00														
#F^>-1 140.20 10.65 10.70 11.00 9.31 9.48									9.68		•			
	J/~>-	140.26				10.65	10.70	11.00		9.31	9.48			

TABLE 5
SUMMARY OF PIEZUMETRIC DATA
(CONTINUED)

	•			DEPIH 10 BRO	UNDHATER FRO	A TOP OF PYC	CASINI			
	PEC CASINO				(FT)					
mill HÜ.	ELEVATION (17-MSL)	29-Har-55	1U-Apr-85	24-Apr-85	25-Apr-85	26-Apr-85	18-500-85	V6-Dec-85	13-Dec-85	20-Dec-85
₽-•	143.08						11.65	7.10	9.26	9.58
P-7	142.76						11.50	9.07	9.23	9.48
P-8	141.25						12.15	11.32	10.63	10.78
ρ_0	141.32						12.20	11.01	10.58	10.73
P-10	142.30						13.40	12.18		12.30
2-11	140.97						22.00	11.22		10.76
P-13	139.37						10.05	8.89		8.73
P-13	142.69						13.60	12.30	12.05	12.20
P-14	141.67						11.15	12.24		12.12
P-15	140.51						11.35	10.14	9.72	9.38
P-Jo	141.18						12.55	11.23		11.41
P-17	137.39							51.3		6.43
P-18	141.98							12.50		12.05
P-19	140.95							12.05		11.97
P-20	139.95							!1.20		10.95
P-21	141.67							12.26		12.07
P-22	141.15							11.86		11.72
D#-1	139.39	14.55	14.64			14.94				
6a-2	140.41	14.65	14.76			15.01				
6H-3	117.90	15.08	15.14			15.37				

SEE REMARKS BELOW

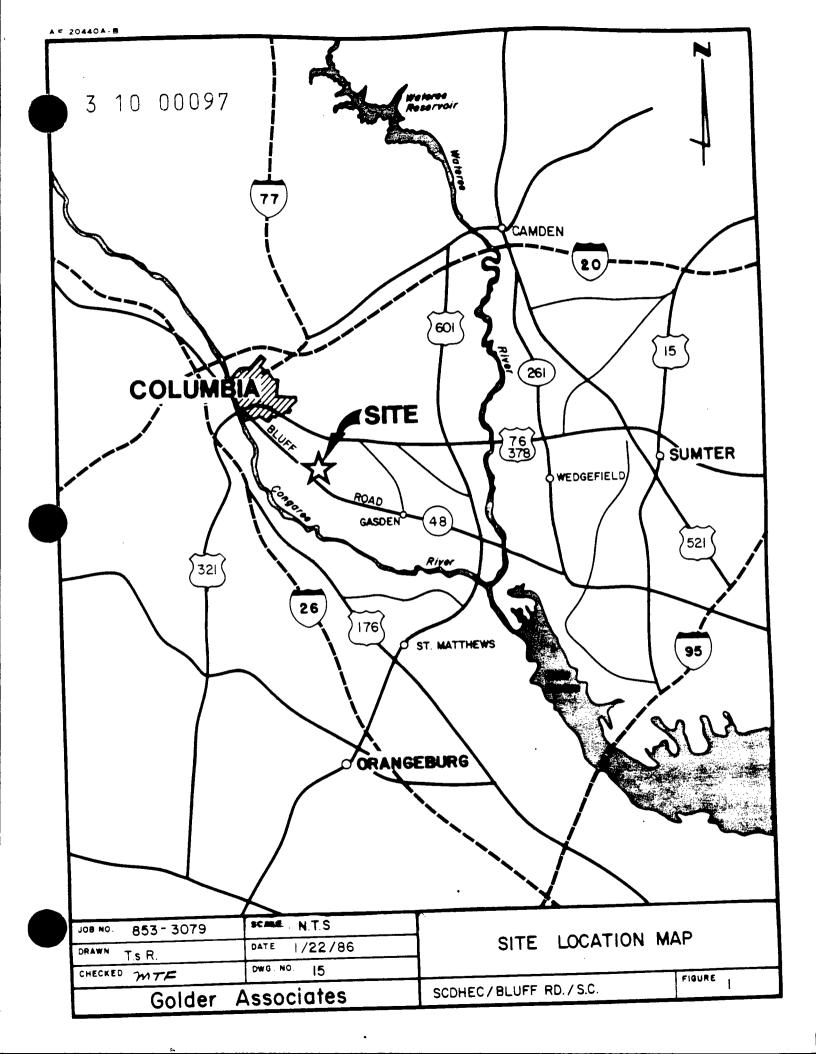
*REMARKS:

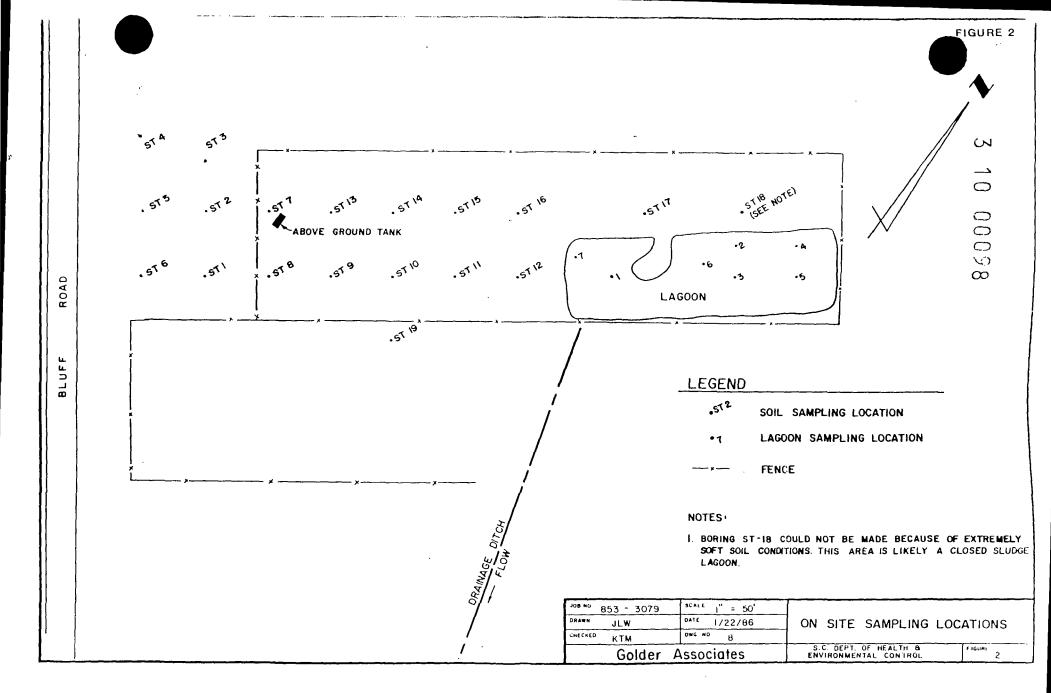
1-24-85: BP1 - ATTEMPTED TO PUMP APPROXIMATELY 24 HOURS EARLIER
2-27-85: BP2 - PUMPED DRANGE APPROXIMATELY 45 MINUTES, MAJER LEVEL
AT 8.6 FT AFTER PUMPING
3-14-95: BP2 - MATER LEVELS BEFORE AIRLIFT
3-15-85: BP1 - APPROXIMATELY 30 MINUTES AFTER PUMPING CORE
BP2 - MATER LEVELS 74 HOURS AFTER AIR LIFTING
3-29-85: BP1 - ORANGE TIP APPARENTLY BLINDED BY DEVELOPERENT

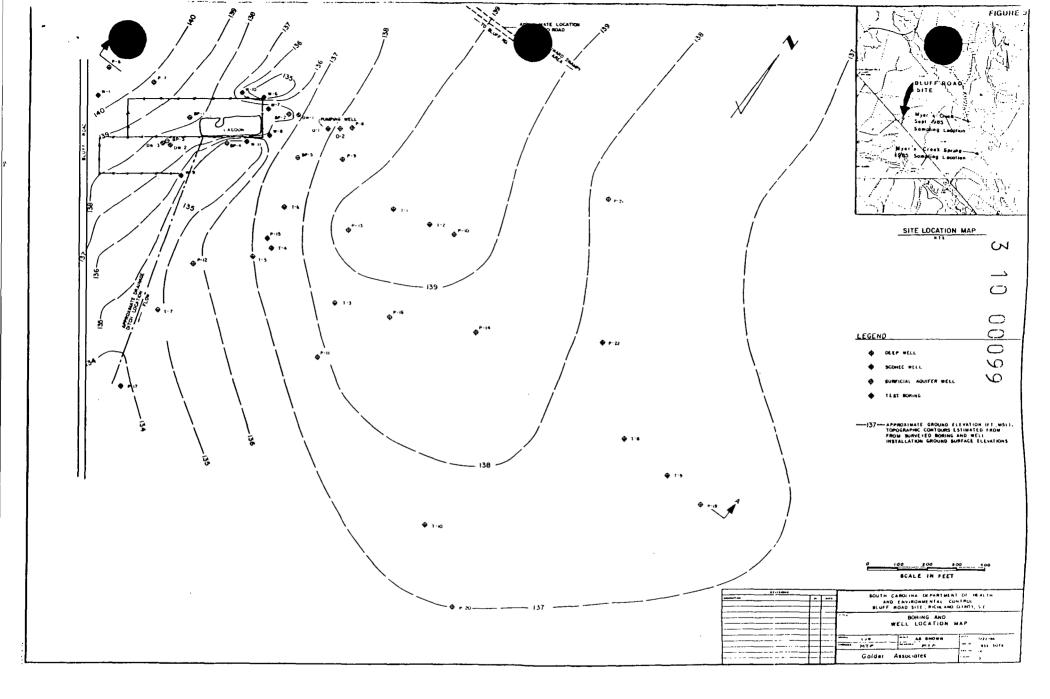
3 10

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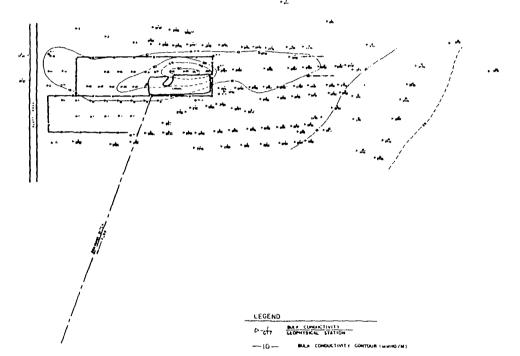
S











---- HINCE CIME

SCALE IN FEET

Africian		Amelia dead are branches of all the
	1-1-	SOUTH CAROLINA DEPARTMENT OF HEALTH
	I=I	AND ENVIRONMENTAL CONTROL BLUFF ROAD SITE, HICHLAND COUNTY, S.C.
		(m)
	I — I -·-	} ··
	l l :	GEOPHYSICAL DATA AND CONTIDUES
		Ot of the plant, the commons
	k- ()	
		Lin 48 BHOME
	· -	man my = 013 - 10/s
	I I i	
	-1	Golder Associates
		L _

DRAWN SEB DATE 1 - 2 2 - 8 6:

CHECKED MTF

Golder Associates

TYPICAL CHROMATOGRAMS

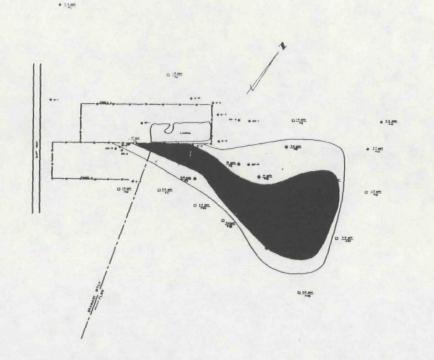
OF SOIL GASES

8.C. DEPT. OF HEALTH & FIGURE 5

S

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02



LEGEND

28 ppm SOIL GAS READING *7 SOIL GAS TEST STATION

O NO CHROMATOGRAPH SCAN

CHROMATOGRAPH SCAN GIVES CONTAM. MATE SIGNATURE

CHROMATOGRAPH SCAN DOES NOT GIVE CONTAMINATE SIGNATURE

SCOHEC WELL

SURFICIAL AQUIFER WELL

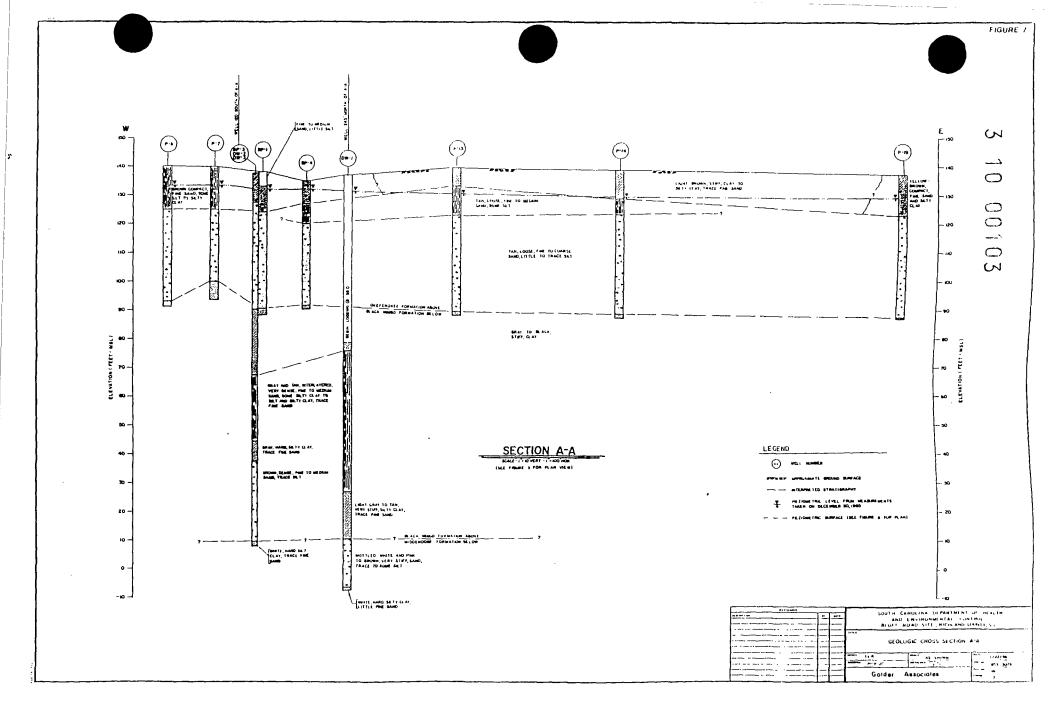
DEEP WELL

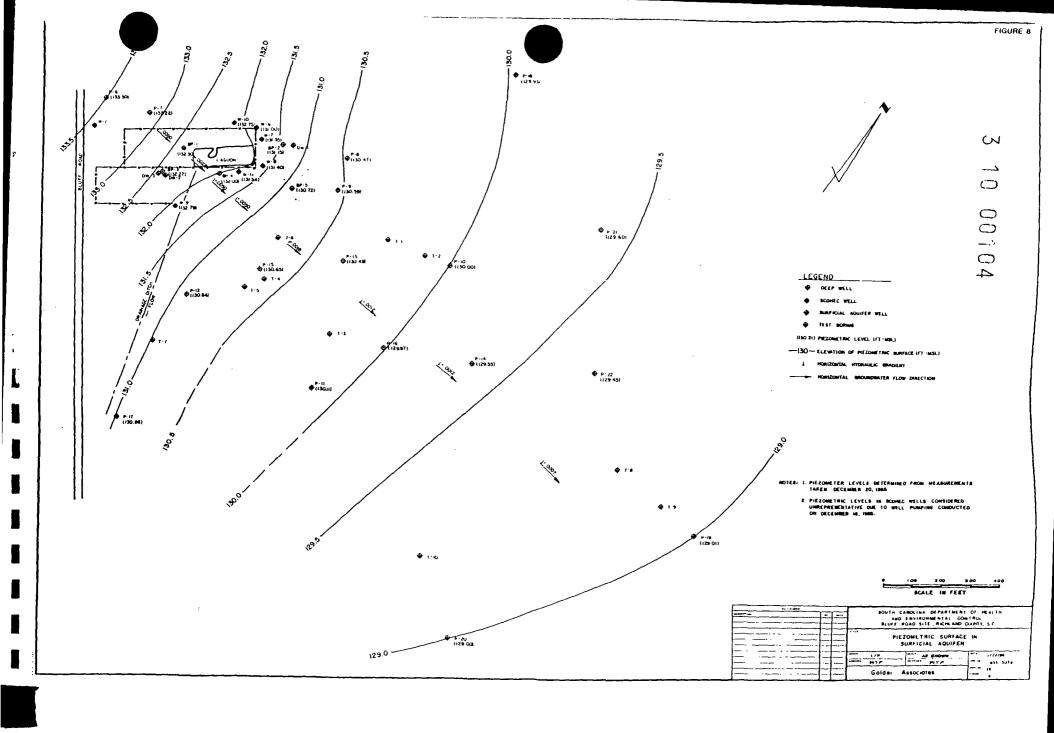
SOIL GAS READING LEES THAN ESPON

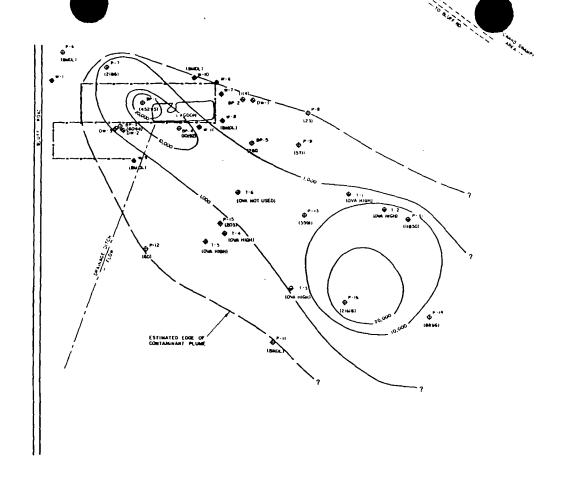
SOIL GAS READING MORE THAN EDPON

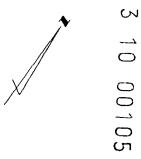
SCALE IN FEET

PL / 140%			SOUTH CAROLINA DEPARTMENT OF HEALTH,					
41 H 1-07 40			AND	ENVIRONMENTAL CONTROL				
			BLUFF R	DAD SITE, RICHLAND COUNT	1.5C			
		2.74.5						
		1	S	OIL GAS SURVEY RESUL	13			
		-						
		25421	81.6	tent as supports	1/22/85			
	The second second	CHRESTA		Tweeter TEB 1				
		- contract	MTE	JEB TEB	055 - 5070			
		-	0.11	Associates				
	-		Golder					









LEGEND

DE EP WELL

SCONEC WELL

BURFICIAL AQUITER WELL

• TEST BORING

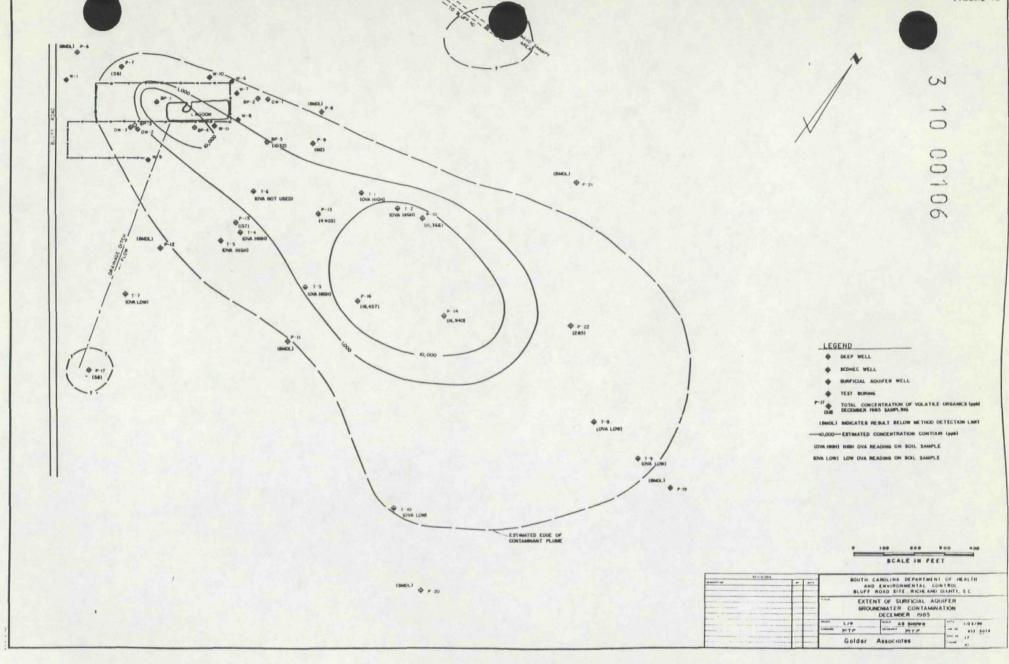
P-IZ TOTAL CONCENTRATION OF VOLATILE ORGANICS (ppb) (60) SEPTEMBER 1940 SAMPLING

(BMOL) BELOW METHOD DETECTION EIMIT

OM HIGH OVE READING ON SOIL SAMPLE

SCALE IN FEET

	at 1-1-mas				CARDLINA OLFARIME	
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		!-	1		D ENVIRONMENTAL C	
		1	1	OLU! F	ROAD SITE, NICHE AME	CONT. SC
		t		554		
		ļ		LATE	INT OF SURFICIAL A	DUIFE#
				CRO	NOWATER CONTAMIN	ATION
		_			SEPTEMBER 1985	
		l i	l 1	L		
		L			AS BHOWN	1/19/84
		J		—,—,; <u>-</u> ,- · ·		1
						433 3019
		1		Golder	Associates	19
r ·	—	i – i		001001	4930010193	1



APPENDIX A
Boring Logs

Appendix A-1
Shallow On-site Borings

Ac	ΕE	MSL CME 55	BORING PROJECT S	LC CDHI) G . EC/B	ST LUF	<u>1</u> _	AD/S.C.		SHEET OF
DATUM	_	MSL	DATE START	ED	1-2	2-8	5	DAT	E COMPL	ETED 1-22-85
DRILL F	RIG.	CME 55	DRILLING ME	ETHO	D	Ho	110	w Stem Au	ger	
	1 1							SAMPLES		İ
ELEV. DEPTH	STRAT. PLOT	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	REMARKS
L0.0		Loose gray to red-brown medium SAND, some silt	fine to	SM						Organic Vapor Rdg.
- -		,				1	DO			20 ppm
						2	DO			10 ppm
4.5		Bottom of hole 4.5 ft.								
Job No.		= 30 / 9 . 4 = 5 '	Golder	A	SSC		ate			Drawn AES

DATUM		ELEV. <u>140.8</u> MSL CME 55	BORING PROJECT SC DATE STARTE DRILLING ME	DHE ED _	<u>C/Bl</u> 1-2	_UFF 2-8	R0.	AD/S.C. DATE	E COMPL	SHEET _ 1 OF _ 1
ELEV. DEPTH	STRAT PLOT			UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	SAMPLES HAMMER	REC.	REMARKS
-0.0 -1.0 -		SAND & GRAVEL-FILL Orange-brown loose fine SAND, some silt.		SM		1 2	DO DO			Organic Vapor Rdg 5 ppm - 3 ppm -
5		Bottom of hole 5.5 ft.				3	DO			5 ppm
Job No.		53-3079_4	Golder	Δ	550	cic	ite			Drawn AES MTF

Scale __1"=5'

FAC	EΕ	LEV	BORING PROJECT	SCDH	EC/I	3LUF	FR	UAU/S.C.		SHEET 1 OF 1
DATUM		MSL	DATE STADE		1 - 22	2-85)	DAT	E COMPL	ETED 1-22-85
DRILL F	≀IG .	CME 55	DRILLING ME	ТНО	D	НО	IOW		er	
	PLOT			ASS.	or		<u>_</u>	SAMPLES		REMARKS
ELEV. DEPTH	STRAT. PL	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	
- 0.0		SAND & GRAVEL-FILL								Organic Vapor Rdg
-1.0	}	Orange-brown loose fine SAND, some silt.	e to medium	SM		1	DO			1 ppm
-	Ì	J. 11, 2, 2, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,				2	DO			l ppm
-						3	DO			l ppm _
5.5		Bottom of hole 5.5 ft.								
Job No	8	53-3079_4	0 .14.:							Drawn AES

Scale _ 1"=5'

Golder Associates

DATUM		139.9 MSL CMF 55	DATE STARTE		1-	22-8	35	DATI	E COMPL	SHEET
ELEV. DEPTH	STRAT. PLOT	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER		SAMPLES HAMMER BLOWS	REC.	REMARKS
-0.0	31	TOPSOIL Loose orange-brown fine SAND, some silt. Bottom of hole 5.5 ft.	to medium			1 2		PER 6 IN.		Organic Vapor Rdg. <1 ppm <1 ppm 4 ppm
		Bottom of more 3.3 ft.								
							,			
Job No.	85 1'	·3-3079_4 '=5'	Golder	A	ssc	ocio	ıte:	s		Drawn AES MTF

URFAC DATUM DRILL F		MSL CME 55	BORING PROJECT DATE STARTE DRILLING ME		-//	-0.		חאדו	- ^^4	SHEET 1 OF 1 ETED 1-22-85
ELEV. DEPTH	FRAT. PLOT	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	REMARKS
5.5	Q.L.S	SAND & GRAVEL-FILL Loose yellow-brown fine SAND, some silt. Bottom of hole 5.5 ft.	e to medium		BLO	1 2 3	0 DO			Organic Vapor Rdg. 2 ppm 1 ppm 1.5 ppm
Job No.	85 1''=	3-3079_4 -5'	Golder	A	ssc	ocio	ate	s		Drawn AES Checked MTF

				BORING	10		 S	T6			SHEET 1 OF 1
_	SURFAC	·F F	ELEV	DOMING	SCI	DHEC	/BL	UFF	ROAD/S.C.	•	
	DATUM		MSL	DATE STARTE	ED	1-2	2-8	5	DATI	COMPL	ETED 1-22-85
	DRILL	₹IG	CME 55	DRILLING ME	тно	D	<u> Ho 1</u>	low	Stem Auge	er	
		PLOT			ASS.	Ĭ			SAMPLES	,	REMARKS
	ELEV. DEPTH	STRAT. PL	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPĘ	HAMMER BLOWS PER 6 IN.	REC.	
	0.0		SAND & GRAVEL-FILL								Organic Vapor Rdg.
	- 1.0 -		Loose yellow-brown fine SAND, some silt.	e to medium	SM		<u>1</u>	DO			4 ppm
	- -		,				2	DO			6 ppm
	<u>-</u>						3	DO			10 ppm
	<u>-</u> -										<u>io ppiii</u>
	6.5		Firm yellow-gray to bro	own fine	sc		4	DO			l ppm _
	8.0		SAND, some silty clay. Bottom of hole 8.0 ft.								
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}	Joh No	Я	53-3079 4								DrawnAES
	Scale	٦٣-	<u>53-3079.4</u> -5	Golder	A	SSC	cic	ate	S		Checked MTF

s	URFAC	E E	LEVPROJECTS	CDH	EC/B	LUF	F R	OAD/S.C.		SHEET 1 OF 1
D	ATUM RILL F	RIG.	MSL DATE STARTS CME 55 DRILLING ME	ED — ETHO	<u> </u>	1011	ow S	Stem Auge	COMPL	ETED
E	LEV.	PLOT	DESCRIPTION	UNIFIED CLASS.				SAMPLES		REMARKS
	PTH	STRAT PLOT		UNIFIED	BLOWS/FOOT	NUMBER	TYPE	BLOWS PER 6 IN.	REC.	
L	.0		SAND & GRAVEL-FILL Loose orange brown fine to medium							Organic Vapor Rdg.
Ë.	••		SAND, some silt.	SM		2	D0			20 ppm
							DO			35 ppm
<u> </u>						3	DO			40 ppm
						4	DO			50 ppm
E_	0.0		Compact light gray to orange	_		5	DO			35 ppm
; ; ; ; ;	0.0		brown firm SAND, some silty clay.	sc		6	DO			20 ppm
t						7	DO			70 ppm
= 1	5.5		Bottom of hole 15.5 ft.							
					<u> </u>				-	
E										
_							Ì			-
-										
- - -										
_										:
F										
<u> </u>										<u>.</u>
F										
										-
					L	L			<u> </u>	
		2	53-3079 A							AES

Job No. <u>853-3079.4</u> Scale 1"=5'

Golder Associates

,ATUM			PROJECT	SCD ED _	HEC/ 1-2	BLU 3-8	F F 5	ROAD/S.C.	E COMPL	SHEET 1 OF 1 ETED 1-23-85
ELEV. DEPTH	STRAT. PLOT	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	REMARKS
0.0		SAND & GRAVEL-FILL								Organic Vapor Rdg.
1.0		Loose orange brown find um SAND, some silt.	e to medi-	SM		1	ДО			3 ppm
F		uiii JAND, Some STIE.		311						
E						2	DO	- - -		3 ppm
<u>}</u>						3	DO			4 ppm
F		·				-				
E						4	DO		ļ <u></u>	
11.0		Compact light gray to		SC		5	DO			25 ppm
12.5		brown moist fine to med some silty clay.	alum SAND,							-
		Bottom of hole 12.5 ft	/							_
Ē									İ	
E										
- - - - -										-
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				'						
Job No.		53-3079.4 =5'	Golder	A	sso	cio	ite	s		Drawn AES Checked MTF

DATUM		MSL	PROJECT	SC	1-23	/BL -85	UFF	ROAD/S.C	E COMBI	SHEET 1 OF 1 OF 1 OF 1 OF 1 OF 1 OF 1 OF 1 O
ELEV. DEPTH	STRAT. PLOT	DESCRIPTION		UNIFIED CLASS.		NUMBER	турЕ	SAMPLES HAMMER BLOWS PER 6 IN.	REC.	REMARKS
0.5		SAND & GRAVEL-FILL Loose yellow-brown fin um SAND, some silt.	e to medi-	SM		2	DO DO			Organic Vapor Rdg. 50 ppm 35 ppm
8.5		Compact light gray to brown fine to medium S silty clay. Bottom of hole 10.0 ft	AND, some	SC		3	DO			40 ppm
Job No.		53-3079.4	Golder	Λ	557	cia	110	c		Drawn AES

JRFA(CE E	LEV	BORING PROJECT_S	LC CDHE) G .	\$1 1uf1	9-A	1./S.C.		SHEET 1 OF 1
ATUM DRILL		 CME 55	DATE STARTE	o _	2/3	/85		DAT	E COMPL	ETED 12/3/85
			DIVIDENTA					SAMPLES		
ELEV. DEPTH	STRAT. PLOT	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	REMARKS
0.0		Refer to Boring ST9 fo stratigraphy.	r			1	TO		0.5/	
- - -						2	ТО		0/2.0	
-							ТО		2.0/2.	þ
7.0		Bottom of Hole at 7.0	ft.							
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Job No.	_8	<u>53-3079</u>	Golder	Δ	SSC	ocio	ite	S		Drawn KJB

SURFAC	E E	NEV. 138.5 MSL	BORING PROJECT	SCD	HEC,	/BLU	<u>FF</u>	ROAD/S.C.		SHEET 1 OF 1
DRILL F	RIG.		DRILLING MI	ETHO	D	<u>Hol</u>	<u>1 ow</u>	Stem Aug	er	
	F			ASS.	[<u> </u>			SAMPLES		REMARKS
ELEV. DEPTH	STRAT. PLOT	DESCR IPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	REMARKS
- 0.0		Loose light brown fine SAND, some silt.	to medium	SM						Organic Vapor Rdg.
<u> </u>		· · · · · · · · · · · · · · · · · · ·				1	DO			90 ppm
_					į	<u> </u>	50		-	
-						2	DO			45 ppm -
<u> </u>										
_								·····		
- 9.0		Compact light gray med	ium to fin	SC		3	DO			50 ppm
10.0		SAND, some silty clay.								
_		Bottom of hole 10.0 ft								-
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	ب ن	3-3079.4				·				100
Job No.		=5 '	Golder	Α	SSC	cio	ite	S		Drawn AES Checked MTF

DATUM .		MSL CME 55	DATE START	ED _	1-2	23-8	110	w Stem Au	E COMPL Iger	ETED 1-23-85
ELEV. DEPTH	STRAT. PLOT	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	REMARKS
0.0		Loose orange-brown fi medium SAND, some sil	ne to t.	SM		1	DO			Organic Vapor Rdg. 40 ppm
						2	DO			10 ppm
8.5		Compact light gray me fine SAND, some silty gray lenses. Bottom of hole 10.0 f	clay with	SC		3	DO			30 ppm

Job No. 853-3079.4 Scale 1"=5'

Golder Associates

	·c c	BORING	L()G	ST:	11- <i>F</i>	1./S.C.		SHEET 1 OF 1
DATUM		PROJECT DATE STAR	TED.	12/	3/8	5	DAT	E COMPL	ETED 12/3/85
DRILL	₹IG .	CME 55 DRILLING M	METHO	00	Ho1	ow	Stem Auge	er	
	1		ASS.	T.			SAMPLES		REMARKS
ELEV. DEPTH	AT. PLOT	DESCRIPTION	UNIFIED CLASS.	BLOWS/FOOT	NUMBER	ш	HAMMER Blows	REC.	NEMANNO.
	STRAT.		UNIF	BLOW	NON	TYPE	PER 6 IN.	/ATT.	
0.0		Dark brown fine SAND, little sil	t SP SM		1	T0		2.3/	
2.5		Orange-brown fine SAND, some clayey silt	SC		2			1.9/	-
5.0		Bottom of Hole at 5.0 ft.	-						<u>.</u> -
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Job No.	8: 1	53-3079 '=5' Golder	Δ	SSC	cio	ite	S		Drawn KJB Chacked MTF

CUREAC	`E E	BORING	L	OG	ST	11-1			SHEET OF
DATUM		PROJECT	<u> </u>	<u>JMEU/</u> 12	2/3/	 ' 85	DAT	F COMPL	FTED 12/3/85
DRILL	RIG.	CME 55 DRILLING	IEU - METH	 OD	Ho1	low	Stem Aug	er	
	1 1		$\overline{}$				SAMPLES		REMARKS
ELEV. DEPTH	STRAT. PLOT	DESCRIPTION	UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	REMARKS
- 0.0		Dark brown fine SAND, little sil	t					1 0/	· · · · · · · · · · · · · · · · · · ·
_			SP SM		1	TO		1.8/	<u>-</u>
- 3.0		Bottom of Hole at 3.0 ft.	-	┼─	\vdash	-			
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	8	53-3079							- V 1P

Job No. 853-3079 Scale 1"=5"

Golder Associates

Drawn KJB
Checked MTF

DATUM DRILL F		MSL CME 55	BORING PROJECT DATE STARTE DRILLING ME	S ED	1 – 2	EC/E	3LUF 35	F ROAD/S.	C.	SHEET 1 OF 1
ELEV. DEPTH	STRAT. PLOT	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	ТУРЕ	SAMPLES HAMMER BLOWS PER 6 IN.	REC.	REMARKS
2.5	9	Loose yellow-gray fine SAND, some silt. Loose dark gray fine to SAND, some silt. Light gray to orange-beto medium SAND, little clay.	o medium			1 A 2	DO AS DO			Organic Vapor Rdg. 75 ppm 10 ppm 60 ppm
9.0		Light to dark gray med fine SAND, some silty	clay.	SC		3	DO			45 ppm
5.		Bottom of hole 15.0 ft								
Job No.	85 1 ''=	3-3079_4 5'	Golder	A	ssc	cio	ate			Drawn AES Checked MTF

	McI		ED _	7	22 (11 ow	Stem Aug		ETED 1-23-85	
LEV. EPTH	STRAT. PLOT	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	REMARKS
0.0		SAND & GRAVEL-FILL		-		1	DO			Organic Vapor Rdg
2.0		Loose brown to gray-br to medium SAND, some s	rown fine			1	100			20 ppm
						2	DO			40 ppm
				SM						
8.5		Compact yellow-brown n	nedium to	SM		3	DO			40 ppm
10.0		fine SAND, some silt.	/		180	3	00			
		Bottom of hole 10.0 ft	:.							

Job No. 853-3079 4 Scale 1"=5'

Golder Associates

	NSHRFAC	e F	141.0 PRO	PRING	LC SCDH) G HEC/	S [*] BLUI	114 F F	ROAD/S.C.		SHEET 1 OF 1	
7	DATUM DRILL		MDL DAT	E STARTE	ED	1-2	<u>3-83</u>		DAT w Stem Au	E COMPL	ETED 1-23-85	
H			UNI UNI	CLING ME					SAMPLES		REMARKS	_
	ELEV. DEPTH	STRAT PLOT	DESCR IPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	NE MANNO	
F	0.0		SAND & GRAVEL-FILL	-	-						Organic Vapor Rdg.	-
E	1.5		Red brown fine to medium little silt.		SP SM		1	DO			25 ppm	-
	3.5		Loose yellow-brown fine tum SAND, some silt.	o medi-	SM		2_	DO			70 ppm	-
E	8.5		Compact yellow brown to l gray medium to fine SAND,	ight some	sc		3	D0			50 ppm	-
	10.0		silty clay. Bottom of hole 10.0 ft.	/								-
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E												_
												-
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Ē												-
ı	lob No	2"=	53-3079.4 5'	older	Α	ssc	cic	ıte	S		Drawn AES Checked MTF	_

OATUM		LEV. 141.2 MSL	BORING PROJECT	SC	DHEC	/BL	UFF	ROAD/S.C	É COMPL	SHEET OF ETED1-23-85
		CME_55	DRILLING MI	ETHO	D		Нс	ollow Ste	m Auger	
	5			ASS.	57		 []	SAMPLES		REMARKS
ELEV. DEPTH	STRAT. PLOT	DESCRIPTION		UNIFIED CLASS	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	
0.0		Red-brown fine to med little silt-FILL	ium SAND,	SP- SM			DO			Organic Vapor Rdg.
2.5		Loose yellow-brown fi ium SAND, some silt.	ne to med-	SM		<u> </u>	50			10 ppm -
- - -		rum ormo, come orror		J.,		2	DO			10 ppm -
- - - -										- -
8.5		Compact light gray to brown medium to fine	orange SAND, some			3	DO			20 ppm
· · · ·		silty clay.	, come	SC						_
						4	DO			10 ppm <u>-</u>
15.0		Bottom of hole 15.0 f	t.							

Job No. 853-3079 4 Scale 1"=5"

Golder Associates

ATUM		MSL	BORING PROJECT DATE START	-D	1-2	3 - 8	5	DATI	COMPL	SHEET _1 _ OF _1
DRILL			DRILLING ME	_		NO.		SAMPLES	ie i	REMARKS
ELEV. DEPTH	STRAT. PLOT	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	
0.0		Loose yellow-gray to brown fine to medium silt.	orange- SAND, some			1	DO			Organic Vapor Rdg.
- • •				SM		2	DO			30 ppm
8.5		Compact orange-brown gray medium to fine S.				3	DO			40 ppm
_		silty clay.		SC						
15.0		Bottom of hole 15.0 f	t.			4	DO			
-										_
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- - -										
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Job No.	8 _="1	53-3079.4	Golder	Δ	SSC	cio	ate	 S		Drawn AES

SURFAC	EE	LEV. 138.9	BORING - PROJECT	LC SC) G DHEC	/BL	ST1 UFF	7 ROAD/S.C	<u>. </u>	SHEET OF
DATUM .		MSL	DATE START	ED _	1-2	3-8	5	DAT	E COMPL	ETED 1-23-85
DRILL R	≀IG .	CME 55	DRILLING MI	ETHO	D	<u>Ho</u>	110	w Stem Au	ger	
	.o.			ASS.	5			SAMPLES	 -	REMARKS
ELEV. DEPTH	STRAT. PLOT	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN,	REC.	
0.0		Waste Time-very soft CLAY.	light gray			_				Organic Vapor Rdg.
<u>-</u>		OLAT.				1	DO			15 ppm
- -]									
-	Ì									
		C+3 CC - 43					}			
6.5		Stiff medium gray CLA fine sand.	ly, and	CL	-	ļ				40 ppm
9.0	\dashv	Compact light gray me	dium to	<u> </u>	ļ	2	DO			, o pp
-		fine SAND, some silty	clay.	sc		3	50			4 ppm
11.5		Bottom of hole 11.5 f	t.	-	-	3	DO			
-										
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	Ω	53-3079_4		<u> </u>						Degree AES
Job No		93-3079_4_ -5 '	Golder	Α	SSC	cio	ıte:	S		DrawnMTF

	ATUM		MSL	PROJECT	SCD ED _	HEC/ 1-23	BLU 8-85	FF I	DAT	E COMPL	SHEET 1 OF 1	
ł					_				SAMPLES		<u> </u>	
	ELEV. DEPTH	STRAT PLOT	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER Blows Per 6 In.	REC.	REMARKS	
ŀ	0.0		Loose orange-brown firmedium SAND, some silt								Organic Vapor R	dg.
F	_		mediam crimely come crim	•	SM		ᆚ	DO			30 ppm	_
F	• •									+	40	-
Ė	• - •						2_	DO			40 ppm	_
-	•											-
F	7.5		Compact light gray med	dium to								-
			fine SAND, some silty	clay.	SC		3	DO			70 ppm	-
Ė	9.5		Loose light gray mediu coarse SAND, some sil	ım to			j	00				-
Ė	_		Codi Se SAND, Some STI	.	SM					}		-
ŀ												-
	1 5 0						4	DO			25 ppm	1
E	15.0		Bottom of hole 15.0 ft	: .								
F	-											4
F	:											1
Ė	-			•								
E												1
F	-											-
E												1
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	Job No Scale	<u> </u>	853 <u>-3079_4</u> =5	Golder	Α	ssc	cio	ate:	S		Drawn AES Checked MTF	

Appendix A-2
Borings for Well Installations

Appendix A-2
Borings for Well Installations

	3 10 00132	Table 1				D.D.	1		
	BC 138.3	ORING	LC	FC/F	luf	f R	oad/SC		SHEET OF
SURFACE	MSL PRO	DJECT	CUN	2-1	2-8	5	044,00		2-13-85
DATUM	CME 55	E STARTE	D _	0	Hol	low	Stem Aug	er compl	2-13-85
		LLING ME					SAMPLES		
ELEV. 138.3	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	REMARKS
122 2	Gray to gray-brown fine to SAND, little silt.		SP- SM						
133.3	Compact brown and tan fine	SAND,		9	1	DO	10-4-5	18/18	
	some silty clay.			10	2	DO	4-5-5		*
			SC	-	3	DO			
				10		DO	4-5-5	24/24	
				14	5	DO	5-6-8	24/24	*
124.3				2	6	DO	1-1-1	18/18	
14.0	Compact to loose tan fine to medium to fine to coarse SA			7	7	DO	2-3-4	18/18	
	little to trace silt, strat comes cleaner and coarser w depth.			18	8	DO	7-8-10	12/18	
			SP- SM to						
			SP	-	9	DO			*
				-	10	DO		0/18	*
103.3				-	11	DO			* *Splitspoon driven
35.0 100.8	See Description on Sheet 2								additional 6" to in- crease sample recov- erv.
37.5.	Continued on sheet 2								
	"=5" G	older	A	SSC	ci	ate	S		Drawn MTF Checked MTF

DESCRIPTION DESCR	SURFAC	CE E	3 10 00133 ELEV138.3	BORING PROJECT S	CDHE	C/B1	uff	Ro	ad/SC		SHEET 2 OF 2
DESCRIPTION SAMPLES RECATT. PER GIN.	DATUM DRILL F	RIG.	CMF 55	_ DATE START _ DRILLING M	ETHO	D	Но	110	w Stem Au	e compl iger	_ETED
37.5 Loose light gray to buff fine SAND, little silt.		RAT			FIED CLASS.			PE	HAMMER BLOWS	REC.	REMARKS
	100.8 - 37.5 - 90.8 - 47.5 - 88.8	STR	Very stiff light gray to black plastic CLAY sand.	SILTY CLAY , some fine	.SP	-	13	D0 D0 D0	PER 6 IN.	/	*
Job No. 853-3079 Golder Associates Drawn	Joh No.	85	3-3079								Drawn MTF

	MUTAG	1	3 10 00134 LEV. 137.2	DATE START	SCD	HEC/ 2-	Blu 14-	ff 85	Road/SC DATE	E COMPL	SHEET 1 OF 2 ETED 2-14-85
	DRILL F		CME .55	DRILLING M		D	7,10		SAMPLES		
	<u>ELEV.</u> DEPTH 137.2	STRAT PLOT	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	REMARKS
	0.0		Loose to compact brown and silty clay.	fine SAND	sc	7	1	DO	1-3-4	8/18	-
	- - 132.2					13	2	DO	3-5-8	6/18	
	5.0		Compact tan and brown some silt.	fine SAND,	SM	18	3	DO	11-8-10	18/18	<u>-</u>
	- - -					9	4	00	3-4-5	12/18	
	124.7					8	5	DO	2-3-5	15/18	-
	12.5		Loose tan fine to medic little silt.	ım SAND,		11	6	DO	3-5-6	18/18	
•	- - -					1,1	7	20	5	10/10	-
}	-				SP- SM	11		טט	5-5-6	18/18	<u>-</u> -
	- - - -					10	8	DO	3-4-6	18/18	
	-										-
	- - -					-	9	DO		0/18	*
	-						10	DO		18/18	*
	99.7						10	50			* Splitspoon driven = additional 6" to in- crease sample recover
}	37.5	85 1" =	Continued on Sheet 2 3-3079 5'	Golder	Α	SSC	ci	ate	s ·		Drawn MTF Checked MTF

JATUM DRILL	_MS	SL 55	BORING PROJECT DATE START	SCDE ED _	EC/1	31uf -14-	f R 85	DATE		SHEET 2 OF 2 ETED 2-14-85
<u> </u>				_				SAMPLES		
ELEV. DEPTH 99.7	STRAT, PLOT	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	REMARKS
37.5		Loose tan fine to medi little silt.	um SAND,	SP-	<u>-</u>	11			18/18	*
- - - - - - - - - - - - - - - - - - -		•			29	12		17-14-15	0/18	*
- 46.5 88.2		Very stiff gray SILTY little fine sand.		СН	86	13		16-36-50	18/18	•
49.0		Hole terminated at 49.	0							* Splitspoon driven an additional 6" to increase sample recovery. A monitoring well was installed in this boring. Refer to Monitoring Well Log for details.
Job No. Scale	1" Golder Associates									

SUB54 S		3 10 00136 BOILEV. 137.5 PRO.								SHEET OF2
ATUM									E COMPI	4-16-85
		CME 55 DRIL								
	-			A 3 S.		SAMPLE				REMARKS
ELEV. DEPTH 137.5	STRAT. PLOT	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	REMARKS
- 0.0		Brown fine SAND, some silt.		CM						
135.0				SM	6	1	D0	3-3-3	18/18	_
2.5		Brown fine to medium SAND,	some						 	
F '		clayey silt.		SC	14	2		3-6-8	15/18	-
F .				3 0	-	3	D0		24/24	
										-
L 127.5					11	4	po	5-6-5	12/18	
10.0		Tan fine to medium SAND, so	ome							-
-		silt.	!	SM	7	5	DO	3-4-3	18/18	
-						_	2.0			
22.5	_				7	6	DO	3-3-4	18/18	-
E 13.0		Tan to buff fine to medium trace silt.	SAND,						 	
		0.466 3116.			7	7_	DO	2-3-4	15/18	_
					6	8	DO	3-3-3	0/18	
- -				SP						-
-						9	DO		18/18	*
-		•								·
<u>-</u> -				·	¹	10	DO		18/18	* ·
<u> </u>					i					
										-
E					-	11	DO		12/18	*
-							_		 	* Splitspoon driven
-										additional 6" to
- -										increase sample recovery.
Ľ										
					ŀ					•
100.0		Continued on Sheet 2		<u> </u>	<u> </u>	<u> </u>	<u></u>		<u></u>	
Job No.		53-3079	older	Λ	ssc		nte	<u> </u>		Drawn MIF
Scale	1"	=5'				, , , ,	<u>.</u>	~		CheckedMTF

		3 10 00137	BORING	LO	G .	BP luf	-3 f R	nad/SC		SHEET 2 OF 2
DATUM		MSL	DATE CTART		1-	15-	ETED 4-16-85			
						SA		SAMPLES		REMARKS
ELEV. DEPTH 100.0	STRAT. PLOT	DESCRIPTION		UNIFIED CLASS	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	
37.5		Tan to buff fine to med trace silt.	dium SAND,		-	12	DO		3/3	
- - -					-	_13	WS			Sample 13 taken fromwashings.
- - -				SP	.	14	DO		18/18	
- - - -					-	15	DO		10/18	*
90.1					16	16	DO	6-10-6	18/18	
47.4 88.5 49.0		Firm gray CLAY, some fir Bottom of Hole at 49.0'		СН	-	117	DO		6/6/	
										* Splitspoon driven additional 6" to increase sample recovery. A monitoring well was installed in this boring. Refer to Monitoring Well Log for details.
Job Na. Scale _		353 - 3079 = 5'	Golder	Д	sso	ocio	ate	S		Drawn MTF Checked MTF

10 00138 BORING LOG BP-4 SHEET $\frac{1}{2}$ of $\frac{2}{2}$ SCDHEC/Bluff Road/SC URFACE ELEV. 134.9 PROJECT_ 4-17-85 4-18-85 ___ DATE COMPLETED ___ MSL DATUM . DATE STARTED _ CME 55 Hollow Stem Auger DRILL RIG DRILLING METHOD ... SAMPLES JNIFIED CLASS REMARKS BLOWS/FOOT DESCRIPTION ELEV. HAMMER REC. DEPTH BLOWS PER 6 IN. 134.9 0.0 Brown and light gray fine SAND and silty clay DOI 1-5-6 11 9/18 SC 28 DO 8-12-16 12/18 19 DO 4-10-9 16/18 126.9 Gray fine to coarse SAND little 8.0 6 4 DOI 4-3-3 to some silt. 18/18 SM 5 DU DO 2-3-3 19.9 6 18/18 15.0 Tan and buff fine to coarse SAND, trace fine gravel, trace silt. DO 0/18 SP 18/18 8 bo 2-3-3 18/18 * 9 DOL 10 DO 5-5-4 10/18 *Splitspoon driven 99.9 additional 6" to 35.0 See description on Sheet 2 increase sample recovery. 97.4 Continued on Sheet 2 Job No. <u>853-3079</u> Drawn MIF Golder **Associates** Scale ___1'=5' Checked MIF

URFA			3 10 LEV. <u>134.9</u> SL		·	BORING PROJECT		SCDH	EC/J	Bluf	f Road/SC		SHEET 2 OF 2
			CME 55			DATE START				Hol	low Stem	Auger	ETED 4-18-85
ELEV. DEPTH		STRAT PLOT		DESCRIP	TION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	REMARKS
37.5			Light brown little si	wn fine lt, trace	to med e fine	ium SAND, gravel	SP- SM	10	11	DO	2-3-7	12/18	
- 91.4 - 43.5 - 89.9 - 45.0			Very hard to medium Bottom of	sand		ome coars	e CH	80	12	DO	28-30-50	6/18	A monitoring well
													this boring. Refer to Monitoring Well Log for details.
- - - - - -													
							,						
Job No. Scale _		5.5	3-3079 = 5			Golder	A	sso	cic	ate	s		DrawnMTF CheckedMTF

DATUM	MSL PROJECT_ MSL DATE STA CMF 55 DRILLING		4-	19-	85	DAT	er compl	ETED 4-19-85
				SAMPLE		SAMPLES		REMARKS
EPTH HT93	DESCRIPTION	UNIFIED CLASS	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	
0.0	Brown fine SAND and silt	SM	10	1	DO	3-5-5	10/18	
3.0	Brown fine to medium SAND, some silt.	SM	-	2	DO		18/18	
131.3	Tan to buff fine to medium SANI trace silt.),	19	3	DO	7-9-10	18/18	
			11	4	00	4-6-5	18/18	
			7	5	DO	3-3-4	18/18	
		SP		6	DO	2-3-5	18/18	
			-	7	DO		18/18	*
			4	8	DO	1-2-2	0/18	
			-	9	DO		0/18	*
								*Splitspoon drive additional 6" to
			5	10	DO	3-2-3	18/18	increase sample recovery.

DATHM		3 10 00141 SLEV. 137.7 MSL CME 55	_ PROJECTS	ED _	.C/B _4-	19-8	E COMPL	SHEET2_ OF2		
ELEV.	AT. PLOT	DESCRIPTION		JNIFIED CLASS.				SAMPLES HAMMER		REMARKS
100.2	STRAT			UNIFIE	BLOWS/FOOT	NUMBER	TYPE	BLOWS PER 6 IN.	REC.	
37.5		Tan to buff fine to me trace silt.	dium SAND,	SP	5	11	DO	1-3-2	0/18	
90.7					-	12	DO			*
47.0 89.2 48.5		Very stiff gray SILTY fine sand. Bottom Of Hole at 48.5		СН	51	13	DO	10-19-32		*Splitspoon driven an additional 6" to - increase sample recovery. A monitoring well was installed in this boring. Refer to Monitoring Well Log for details.
Job No. Scale	_85 1"	53-3079 =5'	Golder	A	ssc	oci	ate	s		Drawn MTF Checked MTF

SURFAC	Ε Ε	3 10 00142	BORING PROJECT	SCD	HEC	/B1u	ıff_	Rd./S.C.	_	
DATUM		MSL	DATE STARTE		8-1.	0.	,	DAT	E COMPLI	ETED 8-13-85
	F			CLASS.			SAMPL			DEMARKS
ELEV. DEPTH	STRAT PLOT	DESCRIPTION		UNIFIED CLA	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER G IN.	REC.	REMARKS
-0.0		Compact, reddish brown, some silty clay.	fine SAND	SM	10	1	00	3-5-5	15/18	- - - - -
25.2					10	2	DO	5-5-5	15/18	- -
15.0		Very loose, tan fine SA silt.	ND little	SP- SM	3	3	DO:	1-2-1	14/18	-
-		grading to,			1	4	DO	1-1-0	12/18	- -
					7	5	DO	1-0-1	13/18	- -
-		Compact, tan fine to me trace silt.	ealum SAND	SP	19	6	DO	4-9-10	18/18	- -
102.7		Continued as Classic			12	7	DO	5-6-6	18/18	
37.5 Job No. Scale] ''=	Continued on Sheet 2 853-3079 5'	Golder	Α	SSC	cio	ate	S		Drawn SKB Checked WBL

SURFAC	CE E	3 10 00143 SLEV. 140.2	BORING	LC SCDI	G .	р. В1 и 1	-6 ff 1			SHEET _2 OF _2		
DATUM		MSL	DATE STARTE	ED 8-13-85 DATE COMPLETED 8-13-85								
DRILL	RIG	CME 45	DRILLING ME		D	Ho						
ELEV. DEPTH 102.7	œ			UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	REMARKS		
-37.5 - -		Compact, tan fine to me trace silt.	edium SAND	SP								
- - -					9	8	DO	3-3-6	15/18	- -		
- - - -										· · · · · · · · · · · · · · · · · · ·		
93.2					33	9	DO	13-18 -15	8/18			
- 47.0 - 91.2 - 49.0		Hard, white and brown (fine to medium sand.		СН	92	10	D0	22-41-51	11.5	-		
		Boring Complete at 49.0 See Well Installation D								- - - - - -		
										-		
Job No. Scale	{] ''=	353-3079 -5'	Golder	A	ssc	cic	ate	S		Drawn SKB Checked WBL		

	SURFAC	Ε E	3 10 00144 SLEV. 139.9	BORING PROJECT	LC SCD	G .	Blu	P-7 ff	Rd/S.C.		SHEET OF
	DATUM		MSL	DATE START	FD	8-1	<u>4-8</u>	5	DAT	E COMPLI	ETED 8-14-85
	DRILL		UIL IS	DRILLING MI	_				SAMPLES		
	ELEV. DEPTH 139,9	STRAT PLOT	DESCR IPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	REMARKS
	-0.0		Compact, reddish brown some clayey silt.	fine SAND	SM						
	- - - - - - -				***************************************	12			4-6-6	18/18	- - - -
						14			5-7-7	12/18	- - - - - - - - - - -
	123.4				SM		3		1-0-1	7/18	- -
	- - - - - -		Compact, tan fine to m	adium SANN		5	4	DO	1-2-3	12/18	- - -
	- - - - - -		trace silt.	eu i um JANO	SP	7	5	DC	3-3-4	12/18	- -
	-					4	6	DC	1-2-2	<u>-/18</u>	: - -
	102.4 37.5		Continued on Chart 2			11	7	DO	1-3-8	-/18	
	Job No. Scale	1"	Continued on Sheet 2 853-3079 =5'	Golder	A	sso	cio	ate	s		Drawn SKB Checked WBL

	DATUM	_	LEV	00145	- DATE START	SCI ED _	OHEC. 3-14	/B1u -85	uff	Rd./S.C.	E COMPL	SHEET2 OF _2
ł	DRILL		0112 40		_ DRILLING ME			HUI	IUW	SAMPLES		DEMARKS
l	ELEV. DEPTH 102.4	STRAT. PLOT		DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	REMARKS
	37.5			, tan fine to ace silt.	medium	SP						
	40.0		Very sti	iff, gray and fine sand.	brown CLAY	СН	10	8	DO	5-5-5	15/18	
	-											
	93.4						30	9	DO	13-13-17	8/18	
-	46.5		Boring (See Well	Complete at 46 Installation	5.5 ft. Log.							
	-											
	-											
	-											
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	_							i				
F												
E								!				
-	Job No. <u>853-3079</u> Scale <u>1"=5"</u>			Golder	A	ssc	cio		S	1	Drawn SKB Checked WBL	

ATUM .		LEV. 138.8 MSL CME 55		SCD ED ETHO	HEC/	B1u	iff 25	Rd./S.C. DATE Stem Auge	COMPLI	ETED <u>8-20-85</u>
ELEV. DEPTH	STRAT. PLOT	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	REMARKS
0.0 136.3 2.5		Gravel Fill Compact, tan fine to SAND trace to little	medium silt.	- SP -						
				SM	41	1	DO	15-23-18	15/18	
					13	2	DO	4-6-7	12/18	OVA= 0.0 ppm
					7	3	DO	3-3-4	/18	OVA= 0.0 ppm
118.8		Compact to loose, tar medium SAND trace sil		SP	10	4	DO	2-5-5	10/18	OVA= 0.0 ppm
					10	5	DO	3-4-6	0/18	
					12	6	DO	3-6-6	5/18	OVA= 0.0 ppm
01.3					8	7	DO	4-4-4	0/18	

DATUM	E E	MSL	BORING LOGP-8							
ELEV. DEPTH	RAT. PLOT	DESCRIPTION	ORIELING MI	UNIFIED CLASS.	BLOWS/FOOT	NUMBER.	TYPE	SAMPLES HAMMER	REC.	REMARKS
37.5		Compact to loose, tan medium SAND trace sil	fine to t.	SP	3		DO DO	1-0-1	10/18 9/18	OVA= 0.0 ppm - - OVA= 0.0 ppm
89.3 51.5 51.5		Stiff, black to dark little fine to medium Boring Complete at 51 See Well Installation	sand. 	СН	45	10	DO	10-19-26	9/18	Note: OVA, refers to the reading on an organic vapor analyzer when applie to the sample.
Job No.		853-3079 5'	Golder	A	SSC	cio	ate	S		Drawn <u>SKB</u> Checked WBL

DATUM	MSL	PROJECT	ED _	8-21	-85		DATE	compl	ETED	8-21-85
STRAT. PLOT	DESCRIPTION		UNIFIED CLASS.	SLOWS/FOOT	NUMBER	ТУРЕ	SAMPLES	REC.		REMARKS
0.0	Hard, light brown SI fine sand.	LT some	ML	-						
132.5	Loose, tan fine SAND silt.	little	SP- SM	44	1	DC	17-19-25	18/18	OVA=	1.0 ppm
				9	2	DO	3-5-4	12/18	OVA=	6.2 ppm
				7	3	DO	2-3-4	18/18	OVA=	5.0 ppm
119.0	Loose, tan fine SAND silt.	, trace	SP	8	4	DO	3-5-4	13/18	OVA=	2.5 ppm
				6	5	DO	2-3-3	0/18		
				1	6	DO	1-0-1	10/18	OVA=	0.4 ppm
.01.0				-	7	DO		12/18	OVA=	1.0 ppm

SURFAC	E E		00149	BORING	LC SCDH	G .	P 31uf	-9 f R	d./S.C.		SHEET 2 OF 2
DATUM				DATE START	ED _	8-2	<u> 21-8</u>	5	DAT	E COMPL	ETED 8-21-85
DRILL	RIG	CME 55		DRILLING M	ETHO	D	Hol	1 _{ow}	Stem Aug	er	
	-0.				LASS.	0.			SAMPLES		REMARKS
ELEV. DEPTH 101.0	STRAT, PLOT		DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	
37.5		Loose, silt.	tan fine SAND	, trace	SP						
-						3	8	DO	2-1-2	10/18	OVA= 1.6 ppm -
Ē											
<u> </u>											
Ē						2	9	DO	1-1-1	14/18	OVA= 3.2 ppm -
E											<u>-</u>
89.0			····								
49.5 87.5 51.0		Stiff, sand.	gray CLAY tra	ce fine	СН	34	10	DO	7-14-20	18/18	OVA= 0.3 ppm
		Boring	Complete at 5	1 0 ft					i		-
		See Wel	ll Installatio	n Log.							- -
1											
- - -											Note: OVA, refers
											to the reading on an organic vapor
-											analyzer when appl-ied to the sample.
							<u> </u>				
-											<u> </u>
E											
<u>-</u> -											
-											-
	<u> </u>	953_3070			l	L	<u> </u>				CVC
Job No. Scale	''=	853-3079 5'	<i>,</i>	Golder	A	ssc	cio	ate	S		Drawn SKB Checked WBL

DATUM		MSL	BORING PROJECT DATE STARTE DRILLING ME	SC	DHEC 8-2	/B1 2-8	uff 5	Rd/S.C.	COMPI		1 of 2 8-22-85
ELEV. DEPTH	STRAT. PLOT	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	SAMPLES	REC.		REMARKS
- 0.0		Stiff, light brown and CLAY trace fine sand		CL							
					39	1	DO	10-16-23	14/18		
124.2					32	2	DO	10-15-17	17/18	OVA=	0.0 ppm
15.0		Loose to compact, ta medium SAND, trace s	n fine to ilt.	SP	1	3	DC	1-0-1	-/18	OVA=	0.5 ppm
					11	4	DO	3-5-6	0/18		
					15,	5	DO	5-7-8	8/18	OVA=	2.0 ppm
					8	6	DO	7-5-3	8/18	OVA=	1.0 ppm
101.7		Continued on Sheet 2			2	7	DO	1-1-1	8/18	OVA=	0.4 ppm
Job No Scale	1"=	53-3079	Golder	A	sso	cio	ate	s		Drawn	WKI

DATUM	MSL 139.2	BORING LOGP-10 PROJECTSCDHEC/Bluff Rd/S.C. DATE STARTED8-22-85DATE COM DRILLING METHODHollow Stem Auger							ETED 8-22-85
STRAT. PLOT	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	SAMPLES HAMMER BLOWS PER 6 IN.	REC.	REMARKS
37.5	Loose to compact, ta medium SAND some gra trace silt.	n fine to ding to	SM to SP	1	8	DO	1-0-1	18/18	OVA= 0.0 ppm
89.7 49.5	Firm, dark gray CLAY	trace find					4-4-8		OVA= 0.2 ppm
87.7	to medium sand. Boring Complete at 5 See Well Information	1.5 ft.	СН	45	10	DO	9-16-28	17/18	Note: OVA, refers to the reading on an organic vapor analyzer when applied to the sample.
	<u>853-3079</u> =5'	Golder	A	ssc	cio	ate	s		DrawnSKB Checked _WBL

`URFA	TURFACE ELEV. 137.9 PROJECT						uff_	Rd/S.C.					
DRILL	RIG	MSL CME 55	DATE START	ED	3-23 D	-85 Holi	low	Stem Auge	COMPLI	ETED	8-23-85		
				CLASS.				SAMPLES			REMARKS		
ELEV. DEPTH	1 02			UNIFIED CL	8LOW9/FOOT	HUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.				
- 0.0		Stiff, light brown to brown CLAY, trace f	o reddish ine sand.	CL									
<u> </u>					63	1	DO	10-23-40	16/18	OVA=	0.2 ppm		
22.9					29	2	DO	7-14-15	14/18	0VA=	0.1 ppm	•	
15.0		Loose to compact, to medium SAND little of trace silt.		SP	3	3	DO	1-0-3	11/18	OVA=	0.0 ppm		
					8	4	DO	3-4-4	11/18	0 V A=	0.0 ppm		
					10	5	DO	3-5-5	4/18	0 VA=	0.0 ppm		
					4	6	DO	1-1-3	12/18	OVA=	4.3 ppm		
100.4		Continued on Chart			6	7	DO	3-3-3	5/18	OVA=	1.2 ppm		
	37.5 Continued on Sheet 2 Job No. 853-3079 Scale 1"=5' Golder						r Associates Drawn SKB Checked WBL						

DATUM		3 10 00153 LEV. 137.9 MSL CME 55	BORING PROJECT DATE STARTE DRILLING ME	SCD ED _	HEC/ 8-2	<u>B1u</u> 3-8	ff 5	Rd/S.C.		SHEET OF2 ETED8-23-85
ELEV. DEPTH	STRAT. PLOT	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	REMARKS
37.5		Loose to compact, medium SAND little trace silt.		SP	13	8	DO	4-6-7	0/18	-
- - - - - 88.9					6	9	DO	2-2-4	6/18	OVA= 0.3 ppm
36.4 51.5		Stiff, black CLAY tra to medium sand. Boring Complete at 51 See Well Installation	.5 ft.	СН	32	10	DO	9-13-19	16/18	OVA= 0.0 ppm
		-								Note: OVA, refers to the reading on an organic vapor analyzer when applied to the sample.
Job No		853-3079 '=5'	Golder	Δ	sso	ocio	nte	S		DrawnSKB Checked _WBL

	_		3 10 00154	BORING	LC) G .	P	-12 f R	 d/S.C		SHEET	oF	2
			MSL 135.9	PROJECT	LDH	8/2	<u>141</u> 5/8	5	4/ 5.0.			8/25/85	
	DATUM		CME 55	DATE STARTI	ED	- H	011	ow	Stem Auge	E COMPL r	ETED	0/23/03	
ł	DRILL	10.		DRILLING ME	_	<u> </u>			SAMPLES				
	ELEV. DEPTH 135.9	STRAT PLOT	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.		REMARKS	
	- 0.0		Stiff, light brown and CLAY trace fine sand.	white	CL								-
	129.4		Loose, tan fine SAND so	ome silt.		53	1_	DO	8-22-31	18/18	OVA=	1.0 ppm	· ·
	-				SM	5	2	DO	3-2-3	14/18	OVA=	3.8 ppm	-
	15.0					3	3	DO	3-2-1	18/18	OVA=	0.1 ppm	- - - - - - -
	-		Compact, tan fine to contrace silt.	oarse SAND	SP	1	4	DO	1-0-1	18/18	OVA _. =	0.0 ppm	-
	- - - - - -					4	5	DO	1-2-2	10/18	OVA=	0.0 ppm	- - -
	- - - - - - -					10	_6	DO	3-5-5	12/18	2nd r	5.3 ppm eading 0.4 ppm	-
	98.4					9	7	DO	3-4-5	4/18	- OVA=	0.5 ppm	
-	37.5 Job No. Scale_	85 1"	Continued on Sheet 2 3-3079 =5'	Golder	Α	SSC	ci	ate	S		Drawn Check	SKB WBL	

DATUM	MSL	BORING LOG P-12 SCDHEC/Bluff Rd/S.C. PROJECT 8/25/85 DAT DRILLING METHOD Hollow Stem A SAMPLES						COMPL		2 of 2 8/25/85
DEPTH VELOTION OF SERVICE SERV	DESCR IPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	SAMPLES HAMMER BLOWS PER 6 IN.	REC.	<u>-</u>	REMARKS
37.5	Compact, tan fine to c trace silt.	oarse SAND	SP	10	8	DO	3-4-6	8.5 - 8	OVA=	0.0 ppm
89.4 46.5	Stiff, dark gray CLAY.		СН	16	9	DO	6-8-8	9/18	OVA=	0.0 ppm
85.9	Boring Complete at 50. Well Installation Log.	O ft. See		59	10	DO	10-19-40	13/18	Note: to the	OVA, refers reading on ganic vapor zer when applies sample.
Job No8	53-3079 =5'	 	sso	cio	ate			Drawn Check	SKB WBL	

00156 11) SHEET 1 OF 2 BORING LOG P-13 SURFACE ELEV. 139.6 PROJECT____SCDHEC/Bluff Rd/S.C. DATE STARTED 8/26/85 DATE COMPLETED 8/26/85 DATUM MSL DRILLING METHOD Hollow Stem Auger DRILL RIG CME 55 CLASS. SAMPLES PLOT REMARKS SLOWS/FOOT DESCRIPTION ELEV. HAMMER UNIFIED 139.6 kg REC. BLOWS PER 6 IN. 0.0 Stiff, light brown and white CLAY trace fine sand. CL 90 1 DO 24-40-50 18/18 OVA= 0.2 ppm 133.1 Loose, tan fine SAND some silt. 6.5 SM OVA= 22.0 ppm 12 2 DO 4-5-7 12/18 OVA= 90.0 ppm 123.1 9 3 DO 4-5-4 11/18 16.5 Compact, tan fine to coarse OVA= 15.0 ppm 0/18 DO 1-2-2 4 SP SAND trace silt. 10/18 OVA= 6.2 ppm 5 DO 2-4-6 101 13/18 OVA= 0.0 ppm 3 6 DO 2-1-2 OVA > 1000 ppm 7 7 DO 3-4-3 0/18 probably instrument 102.1 lerror. 37.5 Continued on Sheet 2 853-3079 Drawn SKB Job No. . Golder Associates "=5 ' Checked WBL Scale .

			3 10 00157	BORING	LC	G .		P-1	3		SHEET2 OF2	
	SURFAC	E EL	EV. 139.6	PROJECT_S	CDHE	C/B	uff	Rd	/S.C.			
	DATUM		MSL	DATE START	ED _	8/26	5/85	<u> </u>	DATE	COMPL	ETED8/26/85	
	DRILL F	RIG _	CME 55	DRILLING MI	ETHO	D	Ho l	low	Stem Aug	er		
		=			CLA3S.	_			SAMPLES		REMARKS	
	ELEV. DEPTH	STRAT PLOT	DESCRIPTION		UNIFIED CL	BLOWS/FOOT	NUMBER	TYPE	HAMMER Blows Per 6 in.	REC.		
	37.5 - -		Compact, tan fine to SAND trace silt, trace gravel.		SP		-	DO.	2 1 1	0/10		
	- - - - - - - -					2	8	טט	2-1-1	9/18		
	89.6					10_	9	DO	5-5-5	-/18	-	
	50.0 88.1 51.5		Stiff, dark gray to Boring Complete at See Well Installati	51.5 ft.	СН	76	10	DO	11-26-50	16/18	-	
											Note: OVA refers to the reading on an organic vapor analyzer when applied to the sample.	
-	-							-				
											-	
	Job No.	ob No. <u>853-3079</u> cate <u>1"=5"</u>		Golder	Associates				S	Drawn SKB Checked WBL		

DATUM	E E	MSL	BORING PROJECT SCARTE DATE STARTE DRILLING ME	DHE ED	<u>C/B1</u> 8/2	uff 7/8	<u>Rd</u> 5	/S.C. DATE	: COMPL	SHEET OF ETED8/27/85
ELEV. DEPTH 138.7	STRAT. PLOT	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	REMARKS
0.0		Stiff, light brown and CLAY trace fine sand.	white	CL						-
128.7					92	1	DO	16-42-50	16/16	-
23.7		Loose, tan, fine SAND,	some silt.	SM	14	2	DO	4-6-8	14/18	- -
15.0			<u></u>		4	3	DO	WH-WH-4	13/18	
-					14	4	DO	2-6-8	6/18	- -
		Compact, light brown, coarse SAND, trace sil fine gravel.		SP	7	5	DO	2-3-4	12/18	-
37.5 Job No		Continued on Sheet 2 353-3079 =5'	Golder	A	sso	ocio	ate	s		Drawn SKB Checked WBL

DATUM _			BORING PROJECT DATE START DRILLING MI	<u>SCD</u> ED _	HEC/ 8/2	Blu 27/8	<u>ff</u> 5	Rd/S.C.	COMPL	SHEET 2 OF 2 ETED 8/27/85
ELEV. DEPTH	TRAT. PLOT	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	SAMPLES	REC.	REMARKS
37.5	· S	Compact, light brown, coarse SAND, trace sil fine gravel.	fine to t, trace	SP	16	×	1		-	-
88.7 - 50.0 87.2		Stiff, gray CLAY.		СН	59	6	DO	14-23-36	10/18	
51.5		Boring Complete at 51.5 See Well Installation (
Job No Scale _] "	85 =5	3-3079	Golder	A	SSC	cio	ate	s		Drawn <u>SKB</u> Checked WBL

DESCRIPTION DESCR	DATUM .		MSL CME 55	DATE START	ED _	9/3	/85		DAT		ETED 9/3/85
130.1 7.5 Tan fine SAND some silt. CL Note: Where sample were not taken boring was logged from auger cuttings 130.1 7.5 Compact, tan fine to medium SP											
sand. CL were not taken boring was logged from auger cuttings Tan fine SAND some silt. SM 122.6 15.0 Compact, tan fine to medium SP		STRAT. PLOT	DESCRIPTION		UNIFIED CLAS	BLOWS/FOOT	NUMBER	TYPE	BLOWS	REC.	REMARKS
7.5 Tan fine SAND some silt. SM 122.6 15.0 Compact, tan fine to medium SP	0.0			e fine	CL						Note: Where sample were not taken boring was logged from auger cuttings
Compact, tan fine to medium SP			Tan fine SAND some si	lt.	SM						
				medium	SP						

DATUM	MSL	PROJECT	<u>SC</u>	DHEC 9/3/	/B1 '85	uff	Rd/S.C.	E COMPL	SHEET 2 OF 2 ETED 9/3/85
DRILL RIG _	CME 55	DRILLING ME		D	HO I	IOW		ier	
ELEV. 74			ASS.	7			SAMPLES		REMARKS
DEPTH TE	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	
37.5	Compact, tan fine to a SAND, trace silt.	medium	SP						:
				13	1	DO	4-7-6	16/18	- -
									<u>-</u>
89.6	CL:CO								-
87.9	Stiff, gray CLAY.		СН		2	RC		9/14	
7	Boring Complete at 49 See Well Installation	.7 ft. Log.							

Job No. <u>853-3079</u> Scale 1"=5"

Golder Associates

Drawn SKB
Checked WBL

URFACE E		PROJECT	SC ED _	DHEC 9/4	/B1 /85	uff	Rd/S.C.	E COMPL	SHEET 1 OF 2 ETED 9/4/85
HTABO 'ABTE	DESCR IPTION		UNIFIED CLASS.	BLOWS/FOOT	NOMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	REMARKS
101.0	Compact, tan fine to SAND little to trace	o medium	ML SP-SM to SP		1		7-9-9 3-5-5	16/18	
Job No	853-3079	Golder	Δ	ssc	cio	ate	S		Drawn SKB Checked WBL

	3 10 00163 BORING LOGP-16_ SHEET 2_ OF 2												
			BORING	LC	G.		P -	16		SHEET 2 OF 2			
.FAC	E E	LEV. 138.5	PROJECT		SCDI	HEC/	Blu	ff Rd/S.C	·				
		MSL CME 55	DATE START	ED	9-4	-85	-11	DAT	E COMPL	ETED 9-4-85			
DRILL	RIG.	CMC 99	DRILLING ME	ТНО	0	H 	011	ow Stem A	luger				
	PLOT			LASS.	01			SAMPLES		REMARKS			
ELEV. DEPTH	RAT. PI	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	ų,	HAMMER Blows	REC.				
101.0	ЗТВ	 		NS I	078	NON	TYPE	PER 6 IN.	72.1.				
37.5		Compact, tan fine to	medium							•			
_		SAND little to trace	silt.	SP-						<u>-</u>			
-				to						-			
<u>-</u>				SP						<u>-</u>			
-				ا د						;			
										<u>-</u>			
-													
								•	·	- -			
89.0	$\left \cdot \right $	Stiff, dark gray CLAY		СН		3	TO	PUSHED	17	<u>.</u>			
9.5								1 031120	17,17	-			
50.9	} }	Boring Complete at 50 See Well Installation								=			
- - -										-			
- - -										<u>-</u>			
- !										-			
-										_			
- '										-			
- -	} }												
- -										<u>.</u>			
- ! - !													
<u>-</u> :										; -			
<u> </u>													
- - -													
- -										:			
- - -										<u>.</u>			
<u>-</u> .				}				i i		-			
- -													
Job No.		353-3079								Drawn SKB			
Scale	"= <u>5</u>	5	Golder	Α	SSC	cio	ate	S		Checked WBL			

EAC .	e F	3 10 00164								SHEET OF
DATUM		MSL	_ DATE START	ED _	11/1	5/8	5	DATE	COMPL	ETED 11/15/85
DRILL	RIG	CME 55	_ DRILLING ME	тно	D	Ho1	low	Stem Auge	rs	
<u> </u>	10			LASS.	0.			SAMPLES		REMARKS
ELEV. DEPTH 134.2	RAT	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	
0.0		Compact fine SAND and	silty clay							
<u>-</u>				SC					<u> </u>	-
124.7					26	1	DO	6-11-15	18/18	OVA = 0.3 ppm .
L 124 7										-
9.5		Loose gray slightly m		-	11	2	DO	6-5-6	18/18	OVA = 2.0 ppm
		fine to medium SAND tr	race Silt	SP						
				31	i 	<u> </u>				
- - -					7	3	DO	2-4-3	18/18	OVA = 44 ppm -
										-
- 115.2 - 19.0		Boring terminated at 1	19.0'. See		-	-				
-		Monitoring well log for details								•
										•
- - -										-
										·
										-
										Note: OVA refers to the reading on an Organic Vapor
				,						Analyser when applied to the sample.
Job No.	8	53-3079 "=5'	Golder	A	SSC	cio	ote	S		Drawn LJW Checked AES

		z 10 00165	DODUM							SHEET 1 OF 2
		3 10 00165 LEV. 139.2								OF
-			PROJECT_S							11/12/05
DATUM		CME 55	DATE STARTE	ED _	11/	Ho]	low	DAT Stem Auo	E COMPL ers	ETED 11/13/85
DRILL	τι σ .		DRILLING ME	_	0			SAMPLES		
E. E.	PLOT	DESCRIPTION		CLAS	8					REMARKS
ELEV. DEPTH 139.2	STRAT. P	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	
0.0		Compact gray to red bro SAND some silty clay	own fine							
		Since Strey Clay		SC	İ					2
<u> </u>					<u> </u>					
-	} }				24	1	DO	3-6-16	18/18	OVA = 0.0 ppm
_					ĺ					
-										<u>-</u>
					14	2	DO	3-6-8		OVA = 0.0 ppm
					 	۴_	00	3-0-8	 	OVA ~ U.U ppm
-					1					:
04.7					_					- -
14.5		Loose gray fine to coar	SA CAND		8	3	DO	2-3-5	18/18	OVA = 0.0 ppm
- - - -		trace to little silt, t			<u> </u>					
-		little fine gravel								_
				SP	 -					-
					13	4	DO	8-7-6	18/18	OVA = 0.0 ppm
										·
-		•								<u>-</u>
					12	5	DO	4-6-6	2/10	
					14	3	טט	4-0-0	3/18	OVA = 0.0 ppm
-		-								:
-				}						-
										<u>:</u>
										:
-										· <u>-</u>
-										•
_					4	6	DO	2-3-1	4/18	OVA = 0.0 ppm _
- 101 7										
- 101.7 37.5		Continued on Sheet 2			L	L				
Job No.	8	53-3079 "=5'	Golder	Δ	SSC	cia	ite	<u> </u>		Drawn LJW
Scale	1	- 5	Coluct	_	550	· • · · ·		•		Checked AES

DATUM		LEV. 139.2 MSL	PROJECT	SCDH ED	EC/B 11/1	1uf 3/8	f Ro	1./SC DATE	COMPL	SHEET 2 OF 2 ETED 11/13/85
DRILL R	IG -	CME 55	DRILLING M	ETHO	D_H	011	ow S	Stem Auger	`S	
	PLOT			LASS.	01	<u> </u>		SAMPLES		REMARKS
ELEV. DEPTH 101.7	RAT.	DESCRIPTI	ON	UNIFIED CLASS	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	
37.5		Loose gray fine to trace to little sil little fine gravel		SP				·		
- - -					12	7	DO	5-5-7	6/18	OVA = 0.0 ppm
86.9 52.3		Boring terminated a	t 52.3'. See		24	8	DO	8-12-12	0/18	Black Mingo clay probably encountere at 52.0', however, attempts to obtain sample failed.
		Monitoring well log details	s for well							Note: OVA refers to the reading on an Organic Vapor Analyser when applied to the sample.
Job No Scale	8:	53-3079 "=5'	Golder	Δ	sso	cio	ate	s		DrawnLJW Checked _AES

DATUM	Έ E	3 10 00167 LEV. 137.6 MSL CME 55	BORING PROJECT DATE STARTI	SCDI	1EC/E	31uf 15/8	f R 35	d./SC	E COMPL	SHEET1 OF2
	PLOT	DESCRIPTION	DRILLING MI	-				SAMPLES		REMARKS
ELEV. DEPTH 137.6	RAT.			UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	
0.0		Compact yellow brown fi and silty clay, with po gray, fine sand, trace	ckets of	sc						
- - - -					22	1	DO	7-7-15	18/18	OVA = 0.0 ppm
					17	2	DO	10-9-8	12/18	OVA = 0.0 ppm
23.1		Loose light gray fine t SAND trace to little cl silt	o coarse ayey	SP	7	3	DO	7-3-4	14/18	OVA = 0.0 ppm
		SIIC		35	11	4	DO	5-5-6	0/18	-
										- -
- - - - - -					5	5	DO	2-2-3	8/18	OVA = 0.0 ppm
							50		3,10	
100.1		Continued on Sheet 2								-
Job No.		Continued on Sheet 2 353-3079 "=5'	Golder	Α	SSC	cio	ite	S		Drawn LJW Checked AES

<u>د</u>

-10-00168 BORING LOG P-19 SHEET 2 OF 2 RFACE ELEV. 137.6 PROJECT SCDHEC/Bluff Rd./SC _____ DATE STARTED ____11/15/85 MSL ___ DATE COMPLETED 11/15/85 DATUM ____ DRILL RIG _CME 55 Hollow Stem Augers DRILLING METHOD_ SAMPLES CLASS REMARKS DESCRIPTION ELEV. HAMMER UNIFIED C REC. DEPTH BLOWS PER 6 IN. 100.1 37.5 Loose light gray fine to coarse SAND trace to little clayey silt SP 31 6 D0 10-11-20 6/18 OVA = 0.0 ppm87.6 0.0 Stiff very dark gray silty CLAY __CH_ -DO Pushed 6/6₇ 7.1 50.5 Boring terminated at 50.5'. See Monitoring well log for well completion details Note: OVA refers to the reading on an Organic Vapor Analyser when applied to the sample. Job No. 853-3079 LJW Drawn_ Golder Associates Checked AES 1"=5'

Scale .

DATUM		MSL	PROJECT	SCDI ED _	HEC/ 11/	<u> 81u</u> 20/	85 85	DATE	COMPL	
ELEV. DEPTH	STRAT. PLOT	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	SAMPLES HAMMER BLOWS PER 6 IN.	REC.	REMARKS
0.0		Stiff light gray to red SILTY CLAY and fine to sand	brown coarse	CL	44	1	DO	7-12-32	18/18	OVA = 0.0 ppm
-					25	2	DO	15-13-12	18/18	OVA = 0.0 ppm
119.5		···			10	3	DO	10-6-4	10/18	OVA = 0.4 ppm
17.5		Loose light gray fine to SAND trace to little si trace to little fine to gravel	lt,	SP	13	4	DO .	5-5-8	6/18	OVA = 0.1 ppm
				,	7	5	DO	4-3-4	4/18	OVA = 0.1 ppm
99.5 37.5 Job No Scale		_Continued on Sheet 2 53-3079 "=5'	Golder	A	sso	cic	ate	s		Drawn LJW Checked AES

DATUM		37.0	 -		BORING PROJECT DATE STAR DRILLING	SCDH	EC/B 11/	1uf 20/	f Ro 85	1./SC DAT	E COMPL	SHEET2_ OF2	
ELEV. DEPTH 99.5	STRAT, PLOT		С	ESCR	IPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	SAMPLES HAMMER BLOWS PER 6 IN.	REC.	REMARKS
37.5	 -	SAND tra	ace t	o lit	ttle :	to coarse silt, to medium	SP	9	6	DO	10-4-5	2/18	OVA = 0.0 ppm
89.2 47.8 87.0		Firm med CLAYEY S Boring t See Moni well det	SILT, termi	nated ng we	fine at	e sand 50.0'.	ML	42	7	DO	9-13-29	18/18	OVA = 0.2 ppm
													Note: OVA refers to the reading on an Organic Vapor Analyser when applied to the sample.
Job No		53-3079 ''=5'				Golder		\ss(cio	ate	s	<u></u>	Drawn LJW Checked AES

ACE ELEV. 137.7 DATUM SL DATE STARTED 12/4/85 DRILL RIG CME 55 DRILLING METHOD Hollow Stem Augers SAMPLES REMARKS DESCRIPTION DESCRIPTION Stiff mottled orange brown and black SILTY CLAY some fine sand CL 46 1 D0 5-8-38 18/18 OVA = 0.2			SHEET 1 OF 2								
ELEV. DEPTH 137.7 Stiff mottled orange brown and black SILTY CLAY some fine sand CL CL SAMPLES SAMPLES REMARKS REC. ATT. CL CL CL CL CL CL CL CL CL CL CL CL CL C	DATUM _		MSL —————————	DATE STARTE	ED	12/	ETED 12/4/85				
O.O Stiff mottled orange brown and black SILTY CLAY some fine sand		\Box			_						
black SILTY CLAY some fine sand	DEPTH	RAT.	DESCRIPTION		UNIFIED CLA	BLOWS/FOOT	NUMBER	TYPE	BLOWS	REC.	REMARKS
F	0.0		Stiff mottled orange broblack SILTY CLAY some for	own and ine sand	CL						
	-					46	1	DO	5-8-38	18/18	OVA = 0.2
	-										- -
23 2 DO 10-11-12 18/18 OVA = 0.0		_				23	2	00	10-11-12	18/18	OVA = 0.0
10.0 Compact orange brown micaceous fine SAND, some to little clayey silt	10.0		fine SAND, some to littl		SM						
$9 \ 3 \ DO \ 4-4-5 \ 10/18 \ OVA = 0.0$						9	3	DO	4-4-5	10/18	OVA = 0.0
120.2	120.2										
17.5 Compact to loose fine to coarse SAND, trace silt	17.5			coarse							
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	-				SP	18	4	DO	12-10-8	6/18	OVA = 0.3 -
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$						4	5	DO	2-2-2	10/18	OVA = 0.8
100.2	100.2										
37.5 Continued on Sheet 2 Job No. 853-3079.11 Scale 1"=5' Golder Associates Checked AFS			53-3079.11	Golder		SCO	nci.	nte			

DATUM	_	MSL 137.7	PROJECT SCDHEC/Bluff Rd./SC DATE STARTED 12/4/85 DATE COMPLE DRILLING METHOD Hollow Stem Augers							SHEET 2 OF 2 ETED 12/4/85
ELEV. DEPTH	2	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	REMARKS
37.5 848.5 849.2	\vdash	Compact to loose fine SAND, trace silt Very stiff medium gray some fine sand Boring terminated at 49 Monitoring well log for details.	SILTY CLAY	SP			ТО			Note: OVA refers to the reading on an Organic Vapor Analyser when applied to the sample.
Job No. Scale	THE GOIGET ASSOCIATES									

DATUM .	3 10 00173 BORING LOG P-22 SHEET 1 OF 2 PROJECT SCDHEC/Bluff Rd./SC DATUM MSL DATE STARTED 11/18/85 DATE COMPLETED 11/18/85 DRILL RIG CME 55 DRILLING METHOD Hollow Stem Augers											
DEPTH	STRAT. PLOT	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	SAMPLES	REC.	REMARKS		
0.0		Dense to loose tan fine and clayey silt	SAND	SC	48	1	DO	22-23-25	18/18	OVA = 0.3 ppm		
122.8					21	2	DO DO		18/18	OVA = 0.0 ppm OVA = 0.0 ppm		
15.0		Compact to loose light to coarse SAND, some silt	gray fine clayey	SM	20	4				OVA = 0.1 ppm		
107.8					9	5	DO	4-5-4	18/18	OVA = 0.1 ppm		
30.0		Compact to loose light to coarse SAND, little silt	gray fine clayey							· .		
37.5 Job No Scale	8	Continued on Sheet 2 53-3079 "=5'	Golder	A	SSO	cio	ate	s		Drawn LJW Checked AES		

DATUM _	_	ISL ME 55	DATE START	D _	11/	18/8 Hol	10w	Stem Auge	DATE COMPLETED11/18/85 tem Augers			
DEPTH	SIRAL PLOI	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	SAMPLES	REC.	REMARKS		
37.5	C	compact to loose light to coarse SAND, little ilt	gray fine clayey	SP - SM	4	6		2-2-2	0/18			
89.8 48.0 87.8	В	llack Mingo Clay		СН	25	7	DO	15-10-15	0/18			
.0	Ui iii si Mi bi	nable to install Monit n this boring due to rands. This boring bac onitoring well install oring 25 ft. south of ocation. See Monitoriog for details.	coring Well cunning ckfilled. led in this							Note: OVA refers to the reading on an Organic Vapor Analyser whe applied to the sample.		

	3 10 00175 BORING LOG _DW-1 SHEET _1 _ OF _3											
	FAC	E E	LEV136.9	PROJECT	SCD	HEC/	<u>B1u</u>	ff F	Road/SC			
٥	ATUM		MSL	DATE STARTE	ED _	2 - 18	<u>-85</u>		DATE	COMPL	ETED 2-26-85	
٥	RILL I	RIG	CME 55	DRILLING ME	ETHO	0	MUD	RO]	ARY			
]			488.				SAMPLES			
DI	LEV. EPTH 36.9	STRAT. PLOT	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	REMARKS	
	0.0		Refer to boring BP-2 for stratigraphy above								Mud rotary drilled a 9" diameter hole 51 ft, set and grout a 6" diameter casing. After grout seal had set, a 5½" boring was begun at 51ft.	
	78.9		Scale change at 58 f	t.							-	
Ē	58.0 75.9		Gray SILTY CLAY, some f coarse sand	ine to	СН	80	1	DO	23-30-50	3/18	Begin log at 58ft.	
E	61.0		Tan fine SAND, little t silt.	o some	SM						-	
						52	2	DO	25-25-27	18/18		
	57.9 69.0		Thinly bedded fine to m SAND some silty clay.		БМ	24 45	3	DO		12/12		
	!			İ						<u> </u>		
- - -	19.4			·							Sample 5:87.0-89.0	
	87.5	요도	Continued on Sheet 2 3-3079									
1	Job No 853-3079 Golder Associates Checked MTF Checked MTF											

TACE I	ELEV. 136.		BORING PROJECT DATE START	SCD	HEC/	Blu 18-	ff 85	Road/SC DATE	E COMPL	SHEET 2 OF 3 LETED 2-26-85
DRILL RIG	UME_33		DRILLING M		0					
49.4 STRAI PLOT		DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	REMARKS
87.5		dded fine to he silty clay.		SM	40	6	T0	18-19-21 26-31-50		Sample 5: 87.0-89.0
26.9				i	85	8	DO	28-35- <u>50</u>	0/17	_
11.9	Very stif	f light gray a	and tan sand.	CL	81	9	DO	31-50 25-56	12/12	
125.0	Continued	on Sheet 3				ــــا 	I			
Job No 8	353-3079 =5'	Golder	ssc	cio	ate	S		Drawn MTF Checked MTF		

	3 10 00177	BORING	LC	G.	DW-	1			SHEET 3 OF 3	
DATUM	MSL	PROJECT	_SC[ED _)HFC./	Rlu	ff. 85	Road/SC DATE	DATE COMPLETED 2-26-85		
		20022000					SAMPLES		2511.512	
STRAT. PLO	DESCRIPTION		UNIFIED CLASS	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	REMARKS	
125.0	Refer to description on	Sheet 2								
126.5	Mottled, white, pink, der fine to medium SAN silt.	and laven- D, some	SM	67	11	DO	24-25-42	18/18	-	
- - - - -									- -	
2.4				75	12	DΩ	25-50	12/12		
134.5	Brown fine to medium Sasilt.	AND, trace	SP					6/6 /		
-144.0	Hard white SILTY CLAY, fine sand.		СП	100		DO	59/6"	12/6/	A monitoring well wa	
	Bottom of Hole at 144.	U ft.							boring. Refer to Monitoring Well Log for details.	
									-	
-										
Job No85	53-3079 =5'	S		Drawn MTF Checked MTF						

3 10 00178												
			BORING	NG LOG DW-2 SHEET 1 OF 2								
FAC	E E	LEV. 137.3	PROJECT	SCDF	HEC/E	31uf	f F	load/SC				
		MSL			2-2	22-8	35	DATE	COMPI	ETED 2-23-85		
DRILL	RIG	CME 55	DRILLING M	EU _	, Mi	JD F	ROTA	RY.		LIED FEED-OF		
			DRILLING MI		10							
1	PLOT			ASS	5			SAMPLES		REMARKS		
ELEV. DEPTH	AT. PL	DESCRIPTION		MIFIED CLASS.	SLOWS/FOOT	E		HAMMER Blows	REC.			
İ	1 2			NE E	107	NUMBER	TYPE	PER 6 IN.	REC.			
137.3	87	Refer to boring BP-3 fo	n cthati	-		-				Mud notoni dnillod		
F 0.0		graphy above 49.0 ft.	Strati-							Mud rotary drilled a 9" diameter hole		
E					}					to 51.5 ft. set and $_$		
E										grouted a 6" diameter		
-	}									casing. After grout seal had set, a 5½"		
F										diameter boring was -		
F										begun at 51.5 ft.		
83.8		Scale change at 53.5 ft	·1~							-		
53.5		Stiff black SILTY CLAY	V	СН	80	1	DO	19-30-50				
80.3												
57.0		Stiff gray SILTY CLAY,	some fine							_		
37.0		sand.	Joine Title					·				
					12	2	DO	5-5-7	8/18			
<u> -</u>							-	i	0, 10	-		
ļ.	}			CL						;		
F										_		
E	1				-							
E					25	3	DO	10-10-15	18/18	_		
E	{ }				ł							
‡												
F					}					-		
67.2					33		DO	0 11 22	10/10			
- 67.3 - 70.0				-	33	4	טט	8-11-22	18/18			
E	1 1	Gray fine to medium SAN			[
<u> </u>		clayey silt to some sil	τ.		i							
-				SM								
ļ					100	- 5	DO	$20-47-\frac{50}{511}$	17/17			
F	}					,		<u> </u>		-		
-]				· ·				
-	}									-		
<u> </u>					100	F 6	חח	21-50	10/16			
]	الـّ	-	4"	10/15] -		
-												
54.8						L	<u> </u>	<u> </u>				
82.5		Continued on Sheet 2										
Job No.	<u>8</u> = ''' 1	53-3079 51	Golder	Δ	SSO	cia	ite	S		Drawn MTF		
Scale			231401		•	. J . \		_		Checked MIF		

s•_____

SURFACE DATUM DRILL F		MSL	137.3		BORING PROJECT DATE START	SCDH	EC/E 2-	1uf 22-	f R 85	oad/SC		SHEET 2 OF 2 ETED 2-23-85
ELEV. DEPTH 54.8	STRAT. PLOT		DESC	RIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS. PER 6 IN.	REC.	REMARKS
82.5		Gray fine silty cla	ay to	some sil	ND, some t.	SM	100+		DO	30- 50	9/9	
95.0		Bottom of				CH	00+	9	DO	19-43-50	1	A monitoring well was installed in this boring. Refer to Monitoring Well Log for details.
Job No.	8! "=	53-3079 5'	Golder	Δ	SSC	ci	ate	s	Drawn MTF Checked MTE			

DATUM		MSL	PROJECT	SHEET1 OF3						
DRILL	110	CME 55	DRILLING MI		D			D ROTARY		
ELEV. DEPTH 137.4	STRAT. PLOT	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	REMARKS
79.4		Refer to borings BP-3 and for stratigraphy above stratigraphy above stratigraphy above strategy. Scale change at 58 ft.	95 ft.							Mud rotary drilled a 9" diameter hole to 53.5 ft. set and grouted a 6" diamete casing. After grout seal had set a 5½" diameter boring was begun at 53.5 ft.
58.0		Refer to borings BP-3 for stratigraphy above	and DW-2 95 ft.		~	1	ТО		24/24	
					-	2	ТО		6/24	
49.9 87.5 Job No.		Continued on Sheet 2 853-3079	Golder	A	sso	ocio	ate	s		Drawn MTE

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DATUM _	M	3 10 00181 LEV. 137.4 ISL	PROJECT	CDE	IEC/E	31uf -26-	f_R 85_	OAd/SC	E COMPL	SHEET 2 OF 3 ETED 3-1-85
				88.				SAMPLES		REMARKS
DEPTH 49.9	STRAT. PLOT	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	REMARKS
87.5		Refer to borings BP-3 a for stratigraphy above Begin Log at 98.5 ft.	and DW-1 95 ft.							
98.5 37.4		Gray SILTY CLAY, trace	fine sand.	CL	100	3	DO	50/6"	4/6 /	
1.0		Brown fine to medium SA silt.	ND, trace	SP	26			12-12-14	6/18 3/18	
12.4										
125.0	<u> </u>	Continued on Sheet 3					 			
Job No Scale	<u>85</u> 1"	53 - 3079 '=5'	Golder	Α	sso	cio	ate	S		Drawn MTF Checked MTF

DATUM DRILL I		3 10 00182 LEV137.4 MSL CME 55	PROJECT	SC	DHEC	26-	uff 85	Road/SC DATE		SHEET3 OF3
ELEV. DEPTH	<u>e</u>	DESCR IPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	T	SAMPLES HAMMER	REC.	REMARKS
-125.0 - 9.4 - 128.0		Brown fine to medium S trace silt. Hard white SILTY CLAY, fine sand.		SP	100	6	DO	25-50/6"	12/12	_
7.9.5		Bottom of Hole at 129.	5 ft.							A monitoring well was installed in this boring. See Monitoring Well Log for details.
Job No.	853	3-3079 1'=5'	Golder	A	sso	cio	ate	 S		Drawn MTF

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RFA	CE E	3 10 00183	BORING PROJECT	LC SCDI	G .	T- Blu	-) ff [Rd/S.C.		SHEET 1 OF 1
DATUM		MSL		ĒΒ	8/2	2/8	5	DATE	COMPL	ETED 8/22/85
	<u> </u>			ASS.	Ļ.			SAMPLES		REMARKS
ELEV. DEPTH	STRAT. PLOT	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	NE MANNO
0.0		Stiff, light brown a · CLAY trace fine sand		CL						-
					59	1	DO	10-24-35	16/18	OVA= 0.0 ppm
					47	2	00	13-22-25	16/18	OVA= 0.4 ppm
16.5		Boring Complete at 1 Backfilled with cutt surface.	6.5 ft. ings to		7	3	DO	5-5-2	7/18	Note: OVA, refers to the reading on an organic vapor analyzer when applied to the sample.
Job No. Scale_	- 8 T"	53-3079 =5'	Golder	A	sso	cio	ate	S		Drawn SKB Checked WBL

to the reading or an organic vapor analyzer when app	DATUM .		LEV	BORING PROJECT DATE STARTE DRILLING ME	SC ED _	DHE 8	/23/	/85	DAT	E COMPL	SHEET
Loose tan fine SAND little SP-SM 5 1 D0 1-2-3 13/18 Boring Complete at 16.5 ft. Backfilled with cuttings to surface. Note: OVA, refer to the reading or an organic vapor analyzer when apprentice.	ELEV. DEPTH	RAT. PLOT	DESCRIPTION		FIED CLASS.	WS/FOOT	MBER	PE	HAMMER BLOWS	REC.	REMARKS
Boring Complete at 16.5 ft. Backfilled with cuttings to surface. Note: OVA, refer to the reading or an organic vapor analyzer when apprentices.	0.0	18		little	SP-		nw .	41			
	16.5		Backfilled with cutt	6.5 ft. rings to		5	1	DO	1-2-3	13/18	Note: OVA, refers to the reading on an organic vapor analyzer when applied to the sample.

DATUM DRILL F	PLOT SIS	10 00165 LEV MSL CME 55 DESCRIPTION		SCD	HEC/ 8/23	/Blu 3/85 11c	ow S	Rd/S.C. DATE tem Auger SAMPLES HAMMER		SHEET 1 OF 1 ETED 8/23/85 REMARKS
DEPTH	STRAT			UNIFIE	BLOWS	NUMBER	TYPE	PER 6 IN.	REC.	
0.0		Stiff, light brown a CLAY trace fine sand	nd white	CL	29	1	DO	2-13-16	16/18	OVA= 0.3 ppm
					36	2	DO	10-16-20	18/18	OVA= 0.3 ppm
14.5		Loose, white buff fi some silt. Boring Complete at I Backfilled to surfactuttings.	6.0 ft.	SM	6	3	DO	1-1-5	10/18	Note: OVA, refers to the reading on an organic vapor analyzer when applied to the sample.
	85.	3-30/9	Golder	A	ssc	cio	ate	s		Drawn SKB Checked WBL

RILL F		CME 55 DRILLING ME		D_F	1011	OW	Stem Auger		
EPTH	STRAT. PLOT	DESCRIPTION	UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	REMARKS
0.0		Stiff, light brown CLAY trace fine sand.	CL						
				41	1	DO	10-14-22	16/18	OVA= 1.6 ppm
6.0		Loose, tan, fine SAND some to little silt.	SM						
			to						
			SP-	8	2	DO	3-3-5	14/18	OVA= 4.8 ppm
			SM						
									0.44
16.0		Boring Complete at 16.0 ft.		5	3	DO	1-2-3	12/18	OVA= 0.9 ppm
		Backfilled to surface with cuttings.							
									Note: OVA, refer to the reading on an organic vapor analyzer when applied to the sample.

		3 10 00187 EV MSL CME 55	BORING PROJECT DATE STARTE DRILLING ME	ED	0/ 2	Ho	iff illow	Rd/S.C. DATE Stem Aug	COMPL er	SHEET	8/24/85
								SAMPLES			REMARKS
ELEV. DEPTH	STRAT. PLOT	DESCRIPTION		UNIFIED CLASS	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.		REMARKS
0.0		Stiff, tan CLAY tra sand.	ce fine	CL a							
-					41	1	DO	16-19-22	11/18	OVA=	0.5 ppm
6.5		Loose, tan, fine SA silt.	ND some	SM							
- -					9	2	DO	3-4-5	6/18	OVA=	2.7 ppm
		grading to,			4	3	DO	1-2-2	11/18	OVA=	0.4 ppm
-											
	į	Very loose, tan fin ium SAND trace silt		SP	3	4	DO	1-2-1	12/18	OVA=	9.4 ppm
25.0		Boring Complete at Backfilled to surfaceuttings.	25.0 ft. ce with							to th an or analy	OVA, refers e reading on ganic vapor zer when appli e sample.
	•	i3-3079									, SKB

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DATUM _	MSL CME 55	DATE STARTE	<u>8</u>	-28-	·85_		DAT		ETED 8-28-85
ELEV.	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	REMARKS
10.0	Stiff CLAY trace fine		SM	12	7	DQ	4-6-6	18/18	
	grading to,			1	2	DC	1:-0-1	6/18	
	Loose, tan, fine to contrace silt.	arse SAND	SP	2	3	DQ	3-1-1	0/18	

DATUM _ DRILL RI	6 _	3 10 00189 EV SL CME 55 Mud Bug	PROJECT DATE STARTE	S(D THO	8-28	3-85	uri	DATE	COMPL	SHEET 2 OF 2 ETED 8-28-85
ELEV. DEPTH	STRAT. PLOT	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	REMARKS
37.5		Loose, tan, fine to co trace silt.	arse SAND	SP			 			: : <u>-</u>
					2	4	DO	1-1-1	12/18	: :
0.0		Stiff CLAY. Boring Complete at 51.	5 ft.	СН	50	5	DO	14-23-27	0/18	- - - -
Job No.		Backfilled with cuttin surface.	gs to		-					Drawn SKB

Scale __

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Checked WBL

FAC DATUM DRILL F		MSL	PROJECT_S	CDHE	11/	1./SC	COMPLE	SHEET 1 OF 2		
ELEV. DEPTH	STRAT. PLOT	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	REMARKS
0.0	in	Firm yellow gray to gray to gray and fine sand	ray SILTY	CL	18	N	-			
					30	1	DO	12-18-12	18/18	OVA = 0.5 ppm
0.0		Loose light gray fine SAND, trace silt	to coarse		7	2	DO	7-3-4	18/18	OVA = 0.0 ppm
		Shirt, crace stre		SP	4	3	DO	5-3-1		OVA = 0.0 ppm
					5	4	DO	2-3-2	10/18	OVA = 0.1 ppm
					2	5	DO	2-1-1	10/18	OVA = 0.0 ppm

"URFAC		3 10 00191 BORING LEV PROJECT_ MSL DATE STAF	SCE	HEC/ 11/	'Blu '14/	ff ! 85	Rd./SC	COMPI	SHEET 2 OF 2 ETED 11/14/85
DRILL F	RIG.	CME EE	METH	00	Ho]	1 ow	Stem Auge	rs	
ELEV. DEPTH	STRAT, PLOT	DESCRIPTION	UNIFIED CLASS	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	REMARKS
37.5		Loose light gray fine to coarse SAND, trace silt	SP		6	DO	12/6"	6/6	OVA = 0.6 ppm
44.5		Stiff medium gray CLAY with healed orange fractures	CL	79	7	DO	12-19-50	18/18	OVA = 0.0 ppm
46.5		Boring terminated at 46.5'. Hole abandoned due to possible trace organics in sample #6. Hole backfilled with cuttings.							Note: OVA refers to the reading on an Organic Vapor Analyser when applied to the sample.
Job No		53-3079 "=5' Golder	- Δ	\ \SS(ocio	ate	s		DrawnLJW CheckedAES

		3 10 00192 BORIN	IG I	LO	G.	T-	8			SHEET 1 OF 1
SURFAC		LEV PROJECT	SCI	DHE	C/B	luli	NU			11/17/05
DRILL		CME 55 DRILLING	ARTED) —	11/.	110	ow S	tem Auge	E COMPL	ETED 11/17/85
DRICE		DRILLING	-		D			SAMPLES		
ELEV. DEPTH	STRAT. PLOT	DESCRIPTION		UNIFIED CLASS	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	REMARKS
0.0		Brown SILTY CLAY some fine san		CL						Boring located 350 west of P-19
7.0		Red-brown fine SAND some silty clay	12 -	SC						
		moist at 14'								
16.0		Red brown to gray fine to medi SAND, little silt	100	P- SM	10	1	DO	6-5-5	19/19	OVA = 0.4 ppm
20.0		Boring terminated at 20.0' and backfilled with cuttings immediately after boring.	i						50,10	Note: OVA refers to the reading on an Organic Vapor Analyser when applied to the sample.
Job No		853-3079 Gold	or	^	666	cia	nto	•		Drawn AES

Scale ____1"=5'

Checked AES

DRILL F		MSL DATE START CME 55 DRILLING M	DATE STARTED 11/17/85 D. DRILLING METHOD Hollow Stem Aug						ETED 11/1//85
					REMARKS				
ELEV. DEPTH	STRAT. PLOT	DESCRIPTION	UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	REMARKS
0.0		Gray SILTY CLAY some fine sand	CL						Boring location 150' west of P-19
3.0		Yellow brown SILTY CLAY and fine sand	CL						
8.0		Light yellow gray fine SAND some clayey silt	SM						
11.0		Moist light red brown to gray fine SAND some clayey silt	SM						
				12	1	DO	6-6-6	18/18	OVA = 0.2 ppm
				20	2	DO	9-10-10	12/18	OVA = 0.3 ppm
20.0		Boring terminated at 20.0' and backfilled with cuttings immediately after boring.							Note: OVA refers
									to the reading of an Organic Vapor Analyser when applied to the sample.

DATUM		MSL	_ DATE STARTE		PROJECT SCDHEC/Bluff Rd./SC DATE STARTED 11/17/85 DATE COMPLETED 11/17/85								
DRILL	RIG.	CME 55	DRILLING METHOD Hollow Stem Augers										
ELEV. DEPTH	STRAT PLOT	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	REMARKS			
0.0		Gray SILTY CLAY some f	ine sand	CL						Boring location 150' west of P-19			
3.0		Yellow brown SILTY CLA fine sand	Y and	CL									
8.0		Light yellow gray fine some clayey silt	SAND	SM									
11.0		Moist light red brown fine SAND some clayey	to gray silt	SM									
					12	1	DO	6-6-6	18/18	OVA = 0.2 ppm			
00.0					20	2	DO	9-10-10	12/18	OVA = 0.3 ppm			
20.0		Boring terminated at 20 backfilled with cutting immediately after boring	gs										
										Note: OVA refers to the reading on an Organic Vapor Analyser when applied to the sample.			

TU195 10 BORING LOG ______ SHEET ____ OF _____ _ PROJECT __SCDHEC/Bluff Rd./SC SURFACE ELEV. _ MSL DATE STARTED 11/21/85 DATE COMPLETED 11/21/85 DATUM _ _ DRILLING METHOD Hollow Stem Augers CME 550 DRILL RIG __ SAMPLES CLASS. REMARKS PLOT **DESCRIPTION** ELEV. HAMMER UNIFIED REC. DEPTH BLOWS PER 6 IN. 0.0 Red brown SILTY CLAY some fine Boring located 300' CL northwest of P-20 sand 2.5 Tan fine SAND and silty clay scl 15.0 Tan medium to coarse SAND, SP trace silt, trace fine gravel 10-8-9 18/18 OVA = 0.8 ppm17 1 DO Boring terminated at 20.0' and 20.0 backfilled with cuttings immediately after boring. Note: OVA refers to the reading on an Organic Vapor Analyser when applied to the sample. Drawn_AES 853-3079 Job No. __ Golder **Associates** Checked _AES Scale ___1"=51

00196 BORING LOG _0-1 SHEET _1 OF _2 138.6 PROJECT SCDHEC/Bluff Rd/SC SURFACE ELEV. _____ BATUM ___MSL DATE STARTED 12-16-85 DATE COMPLETED 12-17-85 Davey Rotary DRILL RIG ___ _ DRILLING METHOD_ SAMPLES UNIFIED CLASS. PLOT REMARKS **DESCRIPTION** ELEV. NUMBER HAMMER REC. STRAT DEPTH BLOWS PER 6 IN. Reddish brown CLAYEY SILT, some 0.0 No samples taken. fine sand Boring logged from auger cuttings. White slightly micaceous fine 6.0 SAND, some silt 8.0 White fine to coarse SAND, trace silt SP Continued on Sheet 2 Job No. 853-3079 MTF Drawn_ Golder Associates MTF

Checked _

MUTAC		3 10 00197 LEV. 138.6 Davey	PROJECTS	SCDH ED _	EC/E 12-1	11uf .6-8	f R 5	d/SC		
ELEV. DEPTH	STRAT, PLOT	DESCR IPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	SAMPLES HAMMER BLOWS PER 6 IN.	REC.	REMARKS
37.5		White fine to coarse silt	and, trace	SP						
49.5		Black to gray CLAY		СЦ						-
53.0		Boring terminated at 5. See Monitoring Well Log for well details.	3.0 ft.							
Job No. Scale	85 1"=	33- <u>3079</u> -5'	Golder	A	ssc	ocio	ıte	s		Drawn MTF Checked MTF

0.0 Orange brown SILTY CLAY and fine No samples taken.	DATUM _		MSL	PROJECT_SCDHEC/Bluff Rd./SC DATE STARTED 12/3/85 DATE CONTRIBLE DESCRIPTION DATE OF DESCRIPTION DATE OF DESCRIPTION DATE OF DESCRIPTION DATE OF DESCRIPTION DESCR				E COMPL	SHEET 1 OF 2 ETED 12/3/85		
Sand CL Boring logged from auger cuttings. 8.0 Yellow brown fine to medium SAND, little clayey silt SP-SM 123.7 15.0 Yellow-gray fine to coarse SAND, little silt SP-SM	ELEV. DEPTH 138.7	STRAT. PLOT	DESCR IPTION		UNIFIED CLASS	BLOWS/FOOT	NUMBER	TYPE	BLOWS	REC.	REMARKS
123.7 15.0 Yellow-gray fine to coarse SAND, little silt SP-SM				and fine	CL						Boring logged from
Yellow-gray fine to coarse SAND, little silt	8.0			dium SAND,	SP-						
	15.0		Yellow-gray fine to coa little silt	rse SAND,							

Job No. 853-3079 Scale 1"=5"

Golder Associates

Checked AES

ATUM	MSL CME 55	_ DATE START	ЕТНО	D	1011	OW	Stem Auge	E COMPLETED	12/3/85
101.2 ELEV.	DESCRIPTION		UNIFIED CLASS.	BLOWS/FOOT	NUMBER	TYPE	HAMMER BLOWS PER 6 IN.	REC.	REMARKS
	Yellow gray fine to co	parse SAND,	SP- SM						
50.1	Stiff dark gray SILTY	CLAY	CL						
52.6	Boring terminated at 8 Monitoring Well Log for details	oz.o. see or well							

APPENDIX B
Monitoring Well Logs

		TOTALIO MELLE MOTATO	
JOB NO 85	3-3079 PROJECT SCOHE	C/BUFF RD/SC WELL NO BE	21 SHEET _ 1 - 4 _ ;
GA INSP	AES DRILLING METHOD +	COLON STON NUCES GROUND ELEV _	138 3 WATER NEATH
WEATHER F	AIR DRILLING COMPANY	GEO CONSTRUCTION COLLAR ELEV _	140.09
WEATHER	DRILLING COMPANY_	COLLAR ELEV COLLAR ELEV	DATE/TIME
TEMP	DRILL RIGCME	55 DRILLER D JONES STARTED 10.30	/ DATE COMPLETED 10 30 Z/14"
			7 100 7 5476
		MATERIALS INVENTORY	
	GE NOTES IN ALL SIZE NOTES	RIT WELL SCREEN SUE M. DIO. NOTES LI BENT	ONUTE AS AL 50 #
WELL CASING.	Car North	WELL SCREEN SUE IN AND THE STREET	Onlie Stat
CASING TYPE_	SEE NOTES		LLATION METHOD POURED
JOINT TYPE			R PACK GTY 280#
GROUT QUANT	тү	CENTRALIZERS FUTE	R PACK TYPE QUIKRETE A.P SWC
GROUT TYPE_		DRILLING MUD TYPE INSTA	LLATION METHOD POURED
ELEV./DEPTH	SOIL / ROCK DESCRIPTION	WELL SKETCH	INSTALLATION NOTES
			BUNDLE PIEZOMETER
•		LOUNTE STEEL TOP OF PYC COVER TITS 480VE G.S.	CONSISTS OF 1" 5U+ 40
			FLUSH THREADED PVC
138.3	GROUND SURFACE	COKRETE	APE (JOINTS TEFLON TATO)
0.0	CRAY TO GRAY BROWN	SEAL SEAL	TO WHICH ARE ATTACHED
	FINE TO MEDIUM	BENTOUTE	(WITH MYLON CARE TIES)
-	SAND, LITTLE SILT	FELLET SEAL	36" I.D x 1/2" O.D.
	(SP.5M)		
133.3		SPEELAT 6	POLYETHYUSIE TUBING
70	COMPACT BROWN	RISER COURED BUILD CRAKE	EACH TUBE WAS SCREENED
_	AND TAN FINE SAND, SOME	1	WITH ~ 7" 3/8"OD VYON
	SILTY CLAY	SCREEN AT 10	POROUS POLYETHYLENE
		Pise Capter	TUBING (PORE SIZE =
•	(sc)	BUE AND YOUR	
			0.050 mm) BUTTED INTO
-		SCREEN AT 14	THE 1/2" TUBING AND
1243		Back	TIPPED WITH RIKED END
140	COMPACT TO LOOSE		TUBING EACH TUBE COLOR-
	TAN FINE TO MEDIUM	HAATERIAL :	COPED AT THE SURFACE
	SOUD, TO FINE TO	SCREEN AT 19'	WITH COLORED PLASTIC
•	COARSE SOND,	BY RISER COORED	TAPE. THE BUNDLE WAS
	LIME TO TRACE		
-	SILT, STRATA BECOMES CLEANER		BUILT BEFORE INSTALLATION
	AND WARKER WITH		AUD INSTALLED DOWN
_	DEPTH	SEREGULAT 24	THE ANNUUS OF THE
	(SRSM TO SP)	BROWN	HOLLOW STEM AJCER
<u>.</u>			WITH JOINTS TEMPORIZILY
	! <u>-</u>	 	BRACED PURING INSTRUMENTAL
	<u> </u>	4 AT 29'	THE FORMATION WAS MUME
-	¦	RISER LOOPED	
		I BY VELOW I	TO COLLAPSE AS THE AUCRES
_	ļ	I'M PVC PIPE NO DELLE	WERE WITHDRAWN THEN
	F	3/8 Favery Vale	THE SANDPACK BENTONITE
·	[E	PACE TUBES THE PACE AT 24	SEAL AND LOCKING COVER
	<u> </u>	PAR COORED	WERE INSTALLED
103.3	<u> </u>	Gee61	WELL DEVELOPMENT NOTES
350	LOOSE LIGHT GRAY	3 2	1. THE I" CORE WAS
:	TO BUFF FINE SAND		1
•	LIME SILT	RISEZ COLORDO	DEVELOPED BY AIRUFING
	P	Bue Bue	WITH NITECOLD THE
-	(5P-5M)		POLYETHYLENE TURES
			COULD NOT BE PUMPED OR
_	<u> </u>	SCREEN AT 44	DEGLORED USING THE
:	E	RISEE COLORED !	PERISTALTIC PUMP BUT
<u>:</u>		INDIO PYC PRANCE	WERE PARTIALLY RIMINGED
-		SCEREN FROM MEDIO	
- ma		46',475'	BY POSITIVE DISPLACEMENT.
90.8 47.5		400 TIP OF WHIL	2. DEANCE" TIP CLOCCED
1	VERY SHIFF LIGHT GRAY SILTY CLAY TO		PURING DEVELOPMENT
88.3 B	CK PASTIC CLAY 10	V. P. V. C. V. V. C. V. C. V. C. V. C. V. C. V. C. V. C. V. C. V. C. V. C. V. V. C. V. V. C. V. V. C. V. V. C. V. V. C. V. V. V. V. V. V. V. V. V. V. V. V. V.	3. BUE 8 ORANGE TIP
500 50	WE FINE SWO		BUNDED.
<u> </u>	(CH)	BOTTOM OF AUGER	
	BOHOM OF HOLE	BORING AT 50 OFT	
<u>.</u>	50.0		
	1	<u> </u>	

	JOB NO 853-3079	PROJECT SCONEC /BLUFF ROAD /4	WELL NO BPZ	
	GA INSP AES	DRILLING HETHOD HOLOW STEM AUGERS	GROUND ELEV 137.2	
		DRILLING COMPANY GEO - CONSTRUCTION	COLLAR ELEV 139.18	DATE/TIME
1	TEMP	DAILL RIG CME 55 DAILLER D. JON	STARTED B: 30 Z/15/85	COMPLETED 17 30 2/15/05
ı				

	MATERIALS INVENTORY	
WELL CASING SEE NOTES IN DIE SEE NOTES !!	WELL SCREEN SEE NOTES IN die SEE NOTES LI	DENTONITE SEAL 50 M
CASING TYPE		INSTALLATION METHOD POURED
JOINT TYPE	51 OT 5175	FILTER PACK GTY 550 #
GROUT QUANTITY	CENTRALIZERS	FILTER PACK TYPE BUILDER'S SAND
GROUT TYPE	DRILLING MUD TYPE	INSTALLATION METHOD POURED

ELEV./DEPTH	SOIL / ROCK DESCRIPTION	WELL SKETCH	INSTALLATION NOTES
		LOUING STEEL TOP OF PYE	BUNDLE RECOMETER CONSISTS OF
137.2	GROUND SURFACE	CONCERTE SEA	PIPE (JOINTS TEHON TAPED) TO
0.0	LOOSE TO COMPACT BROWN FINE SAND	13	CABLE TIES) 3/8" I.D. x 1/2" O.D. ROYETHYLENE TUBNIC, EACH TUBE
•	AND SILTY CLAY (SC)	SS BENTONTE -	WAS SCRENED WITH ~7" 3/8"O.D
5.0	COMPACT TAN TO BROWN FINE SAND,	5.5 Sould Pack	MON POROUS POLYETHINENE TUBING PORE SIZE : 0050 MM
	SOME SILT.	REEN AT 75 REEN AT 75 REEN AT 75	BUTTED INTO THE YZ"TUBING
·	(3 1)		CODED AT THE SURFACE
12.5	LOOSE TAN FINE	RISER COLORED BLACK	THE BUNDLE WAS BUILT
	TO MEDIUM SAND, LITTLE SICT	- COLLAPSED MATERIAL	BEFORE INSTALLATION AND INSTALLED POWN THE ANNILLS
	(SP-SM)	RISER COLORED	OF THE HOLLOW STEM ALLIER
			THE FORMATION WAS AUDITED
		RISER COLORED	WERE WITHDRAWN, THE
		LE PIC PRE WE WRAPPED WITH 3/8	THE SANDPACK BENTONITE
		POLYETHYLENE POLYET AT 27.5 RISER TUBES RISER COORED YELLOW	WELL DEVELOPMENT NOTES
			THE I" CORE WAS DEVILOPED BY AIRLIPTING WITH NITEOGEN
		RISER COORED	THE POLYETHMEN'E TUBES COULD NOT BE PUMPED OR
	-		PERISTALTIC PUMP BUT WEE
		RISER COLORED	PARTIALLY DEVELOPED BY
			1
		BISER COORED DRANGE	,
90 7		18 NO 10 PVC	
. 46.5 . 88 2	VERY STIFF GRAY SILTY CLAY, LITTLE FINE SAND (CH)		
49.0	BOHOM OF HOLE 49FT	BORING AT 49 FT.	
•			
···			1-1

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2

Golder Associates

BOTTOM OF HOLE 49.0 FT.

	MONI	TORIN	IG W	ELL	. IN	IST	ALL	OITA	N LO)(3
JOB NO <u>855</u>	-3019 PROJECT SCOHE	- Bus	E RP/	SC				WELL	₩0 <u>8</u>	۶.	4 SHEET 1 OF 1
GA INSP	55 DRILLING METHOD_H	auow.	STEN	ميد	SER	5 .		GROUN	D ELEV		1349
	INNY DRILLING COMPANY	<u>, (1601.E</u>						COLLA	A ELEV.	_	
TEMPBC	DAILL RIG	כל		DRILLE	* _K	کاکال_		STARTE	0 <u>1 5</u>	<u>. </u>	4/8/85 COMPLETED 3:30 4/8/85 / DATE TIME / DATE
							NTO			_	7 0416
WELL CARING	I'AND Z" men See Notes	14	WIAI	<u> </u>	<u></u>	******************	366 No.1	E5_ 1	1 85=	70-	NITE and IOO #
CASING TYPE	SCH 40 PVC	SCRF	SCREEN En type:	مع <u>ب</u> 0.0	10	<u>Mill</u>	E0 5	OΤ	_ INST.	42L	LATION METHOD POURED
	USH THRENDED TERON TA		mer_F	ÍLTE	e E	ABRI	< WF	'APPE	P FILT	ER	PACK OTY 150 #
1	ITY		PALIZERS						FILT	ΕR	PACK TYPE TOSTER DIXIANA 8:35
GROUT TYPE_		- DRILL	MG MUD	TYPE .					_ INST		LATION METHOD POURED
									==	=	
ELEV /DEPTH	SOIL / ROCK DESCRIPTION			WE	LL	SKE	тсн			L	INSTALLATION NOTES
F											BP4-1 BP4-7 AND BP4-3
<u> </u>	[<u> </u> _	KHIC S	STEEL.	(0,4	e.7_	15	P.OF	PVC.		WERE CONSTRUCTED OF 1"
134.9	CONTINUE CONTINUE				, 		تا (1	'A80 5.		-	VC AND WERE INSTAUCO
0.0	GROUND SURFACE		7	11	╅┪	++	Y				A HOLLOW STEA ALKER
	BROWN AND LIGHT		`	111			Ma	مازود	TE	4	A HOLLOW-STEM AUGER 3P5-4 WAS CONSTRUCTED
F	GRAY FINE SOMO			1.11	T †		1	منعد			OF 7" PYC AND WAS INSTALCE
<u> </u>	AND SILTY CLAY	<u> </u>	4.	'#	- _	44	#/BG	ואסנו	TE.	-	AFTER THE AUGERS WERE
	(sċ)			. И		11	X P	wer	SEAL	1	WITHERAWN.
1769		-	7.5	-111	-	- 	1/5	مله	Rick	1	·
8.0	GRAY FINE TO COARSE		ـا			1	5	& PYC		\vdash	
<u> </u>	SAND, LITTLE TO	-	100		扫	Ħ		PE PYC		1	ALL PUC AND FILTER
	SOME SILT. (SM)	I NE	PIPE 4	1]_[4-4		┰	FABRIC WAS STEAM
								Ree		ı –	CLEANED PRIOR TO
119.9		·	_15, P.			Ħ	9	ATER	<u>60</u>	1	use.
170	TAN AND BUFF		.16.5′				7			╁	
<u> </u>	FINE TO COARSE	+	_		#	3 7	5C8	4-3 EGJ		1	
	SAND, TRACE FINE				<u> </u>					1	
	GRAVEL, TRACE SILT (SP)		21.5	38]]				Ł	
<u> </u>	5.0. (5.)	1		_ []	┼ ╏		ļ			1	
			1							}	
-				-13	╁				 	1	
			27.5				-			╁	·
<u> </u>		-			貫				-	Įv	WELL DEVELOPMENT NOTES
					F		BP4			I	ALL WELLS PRECEDED
-							SCRE		[BY INTERMITTENT AR LIFTING
<u> </u>				- 翔							A I"EDUCTOR PIPE WAS
တ္ခ							'			•	used inside BP3-4. Airufing was performed
35.0	LIGHT BROWN FINE	1-1-			目						AFTER INSTALLATION AND
	TO MEDIUM SAND,		37.5		苴		<u>'</u>]	4	AGAIN BEFORE INITIAL
ţ	LITTLE SILT, TRAKE FINE		38.7	8						1	SAMPLING. FLOW AND
<u> </u>	GRAVEL. (SP-SM)				34		804-] :	times of development
[/-							XXX	~ ` '		₽	WERE
914	LAY SOME	-	43.7							1	FLOW (CAN) TIME (MA
43.5	DARSE TO MEDIUM SAND	-1 [-	15.0	- K	1					1	1 1.5 ZO
45.0	Borrom of Hole				-					I	
F	45 FT.	-					Bons	MO	=	1	2 0.5 60
[AUGE	2 Bot	RING	}-	2 05 :=
F		-		\dashv			 			+	3 0.5 60
							}			1,	4 30
_	i i								•——	-	

3 10 00204

3 10 00205

	MONI	TORI	NG WE	LL	IN	ST	ALL	OITA	N LC	OG
JOB NO 50 5	37-179 PROJECT SCOHEC	Buf	F RO/SC					WELL	NO PF	SHEET 1
GA INSPA	ES DRILLING METHOD	15112	./ <u>Ers</u> /		تقناي ا	<u>5</u>				WATER DEPTH
WEATHER EA			۷					COLLA	R ELEV .	140 2
TEMP _ 80	DRILL RIGCM=	55		HLLER	Ric	<u> </u>		STARTE	0 10.0	COMPLETED THE CONTE
		===	MATE							TIME / DATE
	TAND 2 m dia NOTES									
	SCH 40 PVC		EEN TYPE _	<u>ه.ه</u>	نے	M	<u> ۱۹۲۷ کا ما</u>	OT.	_ INST	ALLATION METHOD POURTO
	FLUSH THREADED TERON TO									7
	ITY		ITRALIZERS _							ER PACK TYPE CHIEROKE FHIS SAND
GROUT TYPE_		DRH	LING MUD T	YPE					INST	ALLATION METHOD POURED
		==			Ξ				==	
ELEV./DEPTH	SOIL / ROCK DESCRIPTION			WEL	L S	KE	TCH			INSTALLATION NOTES
		Lock	ING STEE	<u>, T</u>						BP5-1 BP5-2 AND BP5-3
: -		COV	ER	1			Ţ	P.OF	PVC	WERE CONSTRUCTED OF I"
•		[]				IΓ	Z	5'∆s	OVE	PVC PIPE AND WERE INSTRUCT
1377	GROUND SURFACE			\bot	$\vdash \vdash$	H				THROUGH THE ANNULUS OF
0.0	BROWN FINE SAND		K					ONCR EAL		A HOLLOW STEM MIGER
- 34.7 _	AND SILT (SM)	H	2.5	V	╀	╁╬	1/BE	1104	TE	BPS-4 WAS CONSTRUCTED
3.0	BROWN FINE TO			И		16	L/	LET		OF 2" PUS PIPE AND WAS
.	MEDIUM SAND, SOME SILT (SM)	H		-19-	- -	+-12	<u> </u>	PUCA	PE_	INSTALLED AFTER THE ALLE
131.3) (5M)			И		17	}			WERE WITHDRAWN THE
0.4	TAN TO BUFF FINE		8.0	14	H	 	مڪي آ	NO P	KK.	FORMATION COLLAPSED TO
	TO MEDIUM, SOND,		_,				V			13' THE ANNULUS WAS
•	TRACE SILT (SP)			#		日'		5.4 EENEG	···	FUED WITH WASHED SAN
		PIPE		1		B		15'		TO 2' ABOVE THE SCREEN
•		H	13.0	- H	- -	E,		[THEN PLACED AND ALLONET
		<u> </u>	15'			目				TO HYPRATE OMENIGHT
-			17	-#-	广		 			BEFORE THE LOCKING
_		<u> </u>	17.5				BP	5.3		COVER WAS INSTALLED
•				1	F		Sce	EGYER		
_		<u> </u>		11	LF	匕	1/5	- 22		
		El l			=	"』				ALL PUC AND FILTER
•		-	2 2.5	-14	LE	1.1				FABRIC WAS STEAM
		El l		ă		.]				CLEANED PRIOR TO USE.
-		H !		- 4 -	- 1	1		APY		<u> </u>
		El					1	102.14)	
-		-	27.6	- 🖁 -			<u> </u>			WELL DEVELOPMENT NOTES
					月.			_		
-		H		-		->1	SCR	EEVE	-	Au WELLS DEVELOPED
					3		27.6	o'-35.	<u>'</u>	BY INTERMITTENT AIRLIFTING . A 1' EDUCTOR
-					E	1				PIPE WAS USED INSIDE
	·		35.1		Ħ	•				BPS 4 EACH WELL WAS
-				Ž.						PLIMPED APPROX ZO
-					٥		·			MINUTES AT 3/4-1/2 CPM
				1	1	J				(ESTIMATED), AIRLIFTING
· · •	.		40'	_ [8	de	4				WAS PURPORMED AFTED
• •		<u> </u>		Æ					[CONSTRUCTION AND AGAIN
- -		H		1		بار	BPS			BEFORE INITIAL SAMPLING.
, ; •				涯	۲,	[]	40	47.9]
<u>.</u>				- [注		-	-			
90.7				E	•	0				
47.0 VERY	STIFF GRAY	H	475	1	-	الو				
FINE	SWO (CH)	Ė	40.		4	8	2-	<u>[</u>		
48.5	BOTTOM OF HOLE	Ħ		+	+			12 Ba		
<u> </u>	48.5'	F								1
Ē	1	Ħ		\dashv	\dashv		+	 	 	1
Ţ .		[]	1	1			1	ļ	1]

Golder Associates

	MON	ITORING WELL	INSTALLATIO	N LOG
GA INSP WB WEATHER CL	EAR DRILLING METHOD	HOLLOW STEM AUG	GROUN	NO P-6 SHEET 1 01 1 D ELEV 140.2 WATER DEPTH 9.7 R ELEV 143.08 DATE/TIME 8/13/85 6.20 CN D 5:00 pm/6/15/85 COMPLETED 6.20 pm/6/15/85 TIME DATE
		MATERIAL	S INVENTORY	
CASING TYPE_	SCH 40 PVC	SCREEN TYPE SLC SLOT SIZE CENTRALIZERS	OTTED PVC	I BENTONITE SEAL 3.2 FEET INSTALLATION METHOD HAND POURFD FILTER PACK TYPE CHEPOMEE FAIR SAND INSTALLATION METHOD HAND POURED
ELEV./DEPTH	SOIL / ROCK DESCRIPTION	WEI	LL SKETCH	INSTALLATION NOTES
4().72 0 .0	GROUND SURFACE	3.2 4BOVE (6.8 2.9 ASOVE (45.	STEEL LOVE	ALPK AND FILTER FABRIC WAS STEAM CLEANED PRIOR TO USE
	COMPACT, REDOISH	20	Z-SAND	INSTALLED: 40.0' SCREEN

ELEV./DEPTH	SOIL / ROCK DESCRIPTION	WELL	SKETCH	INSTALLATION NOTES
-		3.2 4BOVE	TOP OF PROTECTIVE	ALL PK AND FILTER FABRIC
-				WAS STEAM CLEANED
E i		2.9' ABOVE (45		PRIOR TO USE
140.2	GROUND SURFACE			
0.0			S SOLLE ETE	INSTALLED: 400' SCREEN
<u> </u>	COMPACT, REDDISH	20	2540	10.0' CASING
	BEOWN, FINE		BENTON ITE	0.5' WELL POINT
£	SAND SOME	52	SEAL STALL	AFTER PULLING THE
;	SILTY CLAY			AUGERS, THE HOLE
E	(SM)	7.1	TOP OF SCREEN	COLLAPSED TO 13.0"
	,			
-			SWO PAK	PLACED SAND PACK TO 5.2"
				PLACED BENTONITE SEAL
<u>.</u> į				TO 2.0'
		130		PLACED SAND TO 1.6
125.2				SET PROTECTIVE STEEL
15.0				COVER IN CONCRETE SEAL
_	VERY LOOSE,		APPROX.	
:	TAN FINE SAND		B" BOEEHOLE	
	LITTLE SILT,			
:	(SP-SM)			
-			2" PYL SCREEN	
ļ			WEAPPED WITH	NOTE:
[GRADING TO,			ALL DOWNHOLE MEASURE-
;				MENTS MADE WITH A
[WEIGHTED TAPE
			Residential I	WELL DEVELOPMENT NOTES
	COMPACT, TAN			B/14/B5 - BALED 10 04-1645
	FINE TO MEDIUM		COLAPSED MATERIAL	
	SAND TRACE		MATERIAL	9/3/85 - HAND PUMPED
-	SILT (SP)			150 GALLONS
;	,			SURGED THE WELL
[SCREEN THEOLIGHT
				OUT AND FUNELD
				75 GALONS.
-			基础	
<u> </u>				
-		700000	W-VAI	
93.2			BOTTOM OF	
47.0	HARD, WHITE AND BROWN CLAY TRACE FINE TO	47.5'		
	MEDIUM SAUD (CH)	49.0	TIP OF WELL	
49.0	BOTTOM OF HOLE 49FT.		SPT BOX NUT	
	·	 	3	
[
		<u> </u>	<u> </u>	

SET PROTECTIVE ETEEL

COVER IN CONCRETE

	MONI	TORING WELL INSTALLATION I	LOG
GA INSP WELL	LATE DRILLING METHOD	DILLOW STEM AUGER GROUND ELE TRI- STATE COLLAR ELE -45 DRILLER DJ/RJ STARTED 12:	V 139.9 WATER DEPTH 11.2 V 142.70 DATE/TIME \$14185 1 1000
		MATERIALS INVENTORY	
CASING TYPE_ JOINT TYPE E GROUT QUANTI	SCH 40 PVC LUSH THREAD TRI-LOG	WELL SCREEN	STALLATION METHOD HAND PULKED LITER PACK OTY 11 FEET LITER PACK TYPE CHEROMER FAIR SAND
ELEV. /DEPTH	SOIL / ROCK DESCRIPTION	WELL SKETCH	INSTALLATION NOTES
139.9	GROUND SURFACE	3.0'4 BOVE G.S. STEEL COVER	FABRIC WAS STEAM CLEANED PRIOR TO USE.
0.0	COMPACT, REDDISH BROWN FINE SAND SOME CLAYEY SILT. (SM)		TNSTALLED: 40.0 SCREEN 7.5 CASING 0.5 WELL POINT AFTER PULLING THE AUGERS, THE HOLE

1234

6.5

MONITO	RING WELL INSTALLATION	LOG	
GA MSP WBL/MTF DRILLING METHOD HOLL WEATHER CLEAR DRILLING COMPANY TR	ABLUFF RD. /S.C. WELL NO _ OW STEM AUGER GROUND EL 1-STATE COLLAR EL DRILLER_DJ/RJ STARTED 4:	EV 138.8 WATER DEPTH 101	3 1
	MATERIALS INVENTORY		0
GROUT QUANTITY	WELL SCREEN 2 IN dia 40 LI SCREEN TYPE SLOTTED PVC SLOT SIZE OIO INCH CENTRALIZERS FRIEND MUD TYPE	ILTER PACK GTY 6 FEET ILTER PACK TYPE CHERONEE FAIR SAND	00208
ELEX/DEPTH SOIL/ROCK DESCRIPTION	WELL SKETCH	INSTALLATION NOTES	
	TOP OF PROTECT	ALL PYC AND SUITER	

ELEY/DEPTH	SOIL / ROCK DESCRIPTION		WELL					INSTALLATION NOTES
	-	27'45046		2	TEEL		FECT VE	ALL PYC AND FILTER
		2.5 ADOVE (4)		-	<u> </u>	<u> </u>	 	FABRIC WAS STEAM
		L'S MOVE CE		19	70° C	P	ا ۲	CLEANED PRIOR TO USE
1 출 <u>명</u> 명 0.0	GROUND SURFACE		10000	1.	-	 	<u>↓</u>	
	GRAVEL FILL			. 2	SEA	épeti L	1 /	
136 3 2.5		2.0		7/00/2	-50	1 0		DISTALLED: 40.0' SCREEN
2.5					3 85	UTDN:	TE	11.8' CASING
			<i>\\\\\\</i>	\////	PE	PT	DEAL	0.5' WELL POINT
	(a	6.0			1	_		AFTER PULLING THE
	COMPACT, TAN				سحا	VD P	ACK	AUGERS. THE HOLE
	FINE TO MEDIUM	9.25			TO	05		COLLASED TO 12.0'
i	SAND TRACE				-50	PEN	 - 	
	TO LITTLE SILT	12.0						PLACED SAND PACK TO 6.0'
	(SP- S M)			Fred				PLACED BENTONITE SEAL
			.==	:			1 1	TO 2.9'
٠				*		 	 	PLACED SAND TO 2.0'
				• •			1	SET PROTECTIVE STEEL
		-			800	EHO	E .	COVER IN CONCRETE
118 8			E		1			SEAL.
20.0		-				 		
					1			NOTE:
			E ==			 	1	ALL DOWNHOLE MEASUR
	COMPACT TO				2" =		2==1	
				74.	άē.≱	PPEC	TER	MENTS MADE WITH A
	LOOSE, TAN FINE		• E=		صت			
	TO MEDIUM SAND							WELL DEVELOPMENT NOTES
	TRACE SILT].	
	(5P)					_	:	9/5/85-SURGED THE
	•		• •===	. *:	-ca	APS	ED :	WELL SCREEN THENIGH-
					MAT	ERIA		OUT HAND PUMPLO
	· :					İ	1	30 GALLONS, SURGED
					1			BOTTOM 20 FEET,
						<u>'</u>	11	PUMPED 20 GALLONS.
								SURGED BOTTOM
								20 FEET PUMPED
					1			20 GALLONS SURGED
						ļ		TOP 20 FEET, PUMPED
								20 GALLONS, SUEGED
							 	TOP 20 FEET PUMPED
						1		20 GALLONS.
							 	
893		49.3		•	BOT	DM C	=	
49.5	STIFF, BLACK TO DARK GRAY	1 500	1 Sec. 16	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		1	CRING	
87 3	MEDIUM JANO (CH)		51.5	7	POF	i	4]
. 51.5	BOTTOM OF HOLEAT 51.5"		 		PT B		 	
								3
		[<u></u>	<u> </u>	1	<u> </u>	1	<u>! </u>	<u></u>

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	WELL NO P-9 SHEET OF
	GROUND ELEV 138.5 WATER DEPTH 977
WEATHER BEINILLA DRILLING COMPANY TRI-STATE	COLLAR ELEV 141.32 DATE/TIME Shill 5 500
TEMP TO F DRILL RIG CINE 55 DRILLER DI/RI	STARTED 30 00 18/2/85 COMPLETED 4 50 00 18/2/4

MATERIALS INVENTORY								
WELL CASING 2 M. 4M 12.1	WELL SCREEN 2 m.dio. 40 LI	BENTONITE SEAL 3.4 FEET						
CASING TYPE 50H 40 PVC	SCREEN TYPE SLOTTED PVC	INSTALLATION METHOD HALD POLICED						
JOINT TYPE ELUSH THREAD TRI-LOC	SLOT SIZE .OIO INCH	FILTER PACK OTY 4.0 FEET						
GROUT QUANTITY	CENTRALIZERS	FILTER PACK TYPE CHEROKEE FAI3SAND						
GROUT TYPE	DRILLING MUD TYPE	INSTALLATION METHOD HAND POURED						

120 6		.1				SKE		_		INSTALLATION NOTES
120 €			_			To	PO	PROT	ECTIVE	ALL PUC AND FILTER
120 €	1	2.8'	BOVE	<u>د د</u> ک		3	700	E.P.	K.	FABRIC WAS STEAM
120 €				~ -		19				CLEANED PRIOR TO USE.
138.5	GROUND SURFACE				<u> </u>					
0.0	HARD, LIGHT BROWN		1.0		}	******	-co-c	RETE	SEAL	<u></u>
. :	SILT SOME FINE	-		**(#			2.54	Δ		THOTALLED: 40.0' SCREEN
į	SAND (ML)		3.1'	/////	1	111111	PSEN	TOUT TOUT	E	12.1 CASING
132.5		 		###	1		-PEL	LET	SEAL	0.5' WELL POINT
6.0			6.5							AFTER PULLING THE
1	LOOSE, TAN FINE	1			t-		444	D PA	- 1	AUGERS, THE HOLE
	SWO LITTLE		9.31				_	!	l 1	COLL APSED TO 10.5'
	SILT (SP-SM)		105		===	400				
. 1	· · ·									PLACED SAND FAINTO 65'
		1						1		PLACED BENTONITE DEAL
.								<u> </u>	 	TO 3.1'
[1	PLACED SAND TO NO
•					 ==	0 0	<u> </u>			SET PROTECTIVE STEEL
1190]]		- •	==	•	400			COVER IN CONCRETE
19.5								ROK.		SEAL.
ŀ					}==	1	2			1
·	LOOSE, TAN FINE	-		•						NOTE
12	SAND, TRACE	11		•						ALL DOWNHOLE MEASURE-
	SLT (SO)									MENTS MADE WITH A
.	(SP)									WEIGHTED TAPE
)								APPEL H FIL		WELL DEVELOPMENT NOTES
· }		1			===					8/23/85 - BALED
								_		22 GALLONS.
.				4.0				APSE		9/5/85- SURGED WELL
1		:[]			E=	* **	MA	ERV	-	SCREEN THEOUGH DUT.
-		 							 	PUMPED 30 GALLONS
		<u>:</u>								SURGED BOTTOM 20 FEET PUMPED
: [++				4.4	 		 	20 GALLONS SURGED
1					===		l			TOP 20 FEET PUMPED
	}	:				200	j]		30 GALLONS.
.					☷			L	<u> </u>	
						4.5	l			
-		:						-		_
89.0			49 5		==			om o		}
495 87.5	STIFF, GEAY CLAY TRACE FINE SALID (CH)		+ 1. 5	44. 6.	386.3	TIS	OF V	<u> </u>	 	
	BOTTOM OF HOLE AT			51.0		280	TOM	DF.		}
	51.0 FT			!	1	 5 2	60	LIAKE		1
·				<u> </u>	1	<u> </u>				

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- -	10
	0021

GROUT QUANTITY CENTRALIZERS FILTER PACK GTY B.O FEET FILTER PACK TYPE CHE COME FOLDS	
GA INSP WBLIFWS DRILLING METHOD HOLLOW! STEM AUGER GROUND ELEV. 139.2 WATER DEPTH 10.5 WEATHER CLEAR DRILLING COMPANY TRI-STATE COLLAR ELEV 142.30 DATE/TIME SISSESSED FROM STARTED COMPANY TRIE OF THE COMPLETED STARTED COMPANY THE COMPLETED STARTED COMPLETED STARTED COMPLETED STARTED COMPLETED STARTED COMPLETED STARTED COMPLETED STARTED COMPLETED STARTED COMPLETED STARTED COMPLETED STARTED COMPLETED STARTED COMPLETED STARTED COMPLETED STARTED	108 NO PESS-3079 PROJECT SCOHEC/BLUFF ED/S.C. WELL NO P-10 SHEET I OF
TEMP 90° F DARL RIG CME 55 DRILLER DT RT STATE COLLAR ELEV 142.30 DATE/TIME 5: 355 C TEMP 90° F DARL RIG CME 55 DRILLER DT RT STATED 6000 Role 165 COMPLETED 9 375 TIME / DATE MATERIALS INVENTORY WELL CASING 2 M. dig 11.0 11 WELL SCREEN 2 M. dig 40 LI BENTONITE SEAL 3.5 FEET CASING TYPE 50H 40 PVC SCREEN TYPE SLOTTED DVC INSTALLATION METHOD HAND POLICE JOINT TYPE FLUSH THREAD TEL-LOC SLOT SIZE	GA INSP WBLIFUS DRILLING METHOD HOLLOW! STEM AUGER GROUND ELEV 139. 2
TEMP GOF DARL RIG CME 55 DRILLER DIP STARTED GOMBAZZAS COMPLETED 37311. MATERIALS INVENTORY WELL CASING 2 M. dig. 11.0 11 WELL SCREEN 2 M. dig. 40 LI BENTONITE SEAL 3.5 FEET CASING TYPE 5CH 40 PVC SCREEN TYPE SLOTTED DVC INSTALLATION METHOD HAND POJE JOINT TYPE FLUSH THREAD TEI-LOC SLOT SIZE	
WELL CASING 2 M. dig. 11.0 11 WELL SCREEN 2 M. dig. 40 LI. BENTONITE SEAL 3.5 FEET CASING TYPE 5CH 40 PVC SCREEN TYPE SLOTTED DVC INSTALLATION METHOD HAND POUR JOINT TYPE FLUSH THREAD TEL-LOC SLOT SIZE OIO INCH GROUT QUANTITY CENTRALIZERS FILTER PACK TYPE CHE COXFE F4 12.5	TEMP 90 F DAIL RIG CME 55 DRILLER DJ RJ STARTED 60 PM/8/22/85 COMPLETED 9 37211 /2/5
WELL CASING 2 M. BIL 11.0 IS WELL SCREEN 2 M. BIL BENTONITE SEAL 3.5 FEET CASING TYPE 5CH 40 PVC SCREEN TYPE SLOTTED DVC INSTALLATION METHOD HAND POLICY JOINT TYPE FLUSH THREAD TELLOC SLOT SIZE OIO INCH FILTER PACK GTY 6.0 FEET GROUT QUANTITY CENTRALIZERS FILTER PACK TYPE CHE COXER FALLS.	
CASING TYPE SCH 40 PVC SCREEN TYPE SLOTTED DVC INSTALLATION METHOD HAND POLICE JOINT TYPE FLUSH THREAD TEL-LOC SLOT SIZE OIO INCH PILTER PACK GTY B.O FEET GROUT QUANTITY CENTRALIZERS FILTER PACK TYPE CHE COXFE F4 12 5	MATERIALS INVENTOR
	WELL CASING 2 M. dig. 11.0 1.1 WELL SCREEN 2 M. dig. 40 LI. BENTONITE SEAL 3.5 FEET ASSING TYPE 5CH 40 PVC SCREEN TYPE SLOTTED PVC INSTALLATION METHOD HAND POLICED OINT TYPE FLUSH THREAD TELLOC SLOT SIZE

GROUT TYPE_	DRILLING MUD TYPE INSTALLATION METHOD_HAND PO JEES								
ELEV./DEPTH	SOIL / ROCK DESCRIPTION			VELL	SKE	тсн			INSTALLATION NOTES
		34 ASOVE C				Top 0	F 86	TE CTIVE	ALL PIC AND FILTER
		3.1 400VEG	- 1		-		DE P		FABRIC WAS STEAM
					1 1		İ		CLEANED PRIOR IS USE
12.0 2	GROUND SURFACE			<u> </u>		· .			
0.0		1.0	o Elli	4				EAL	ENSTALLED 40.0' SCEEN
	e		0	1	mi		Ь		11.0'CASING
	STIFF, LIGHT			4		-BEA	TON	TE	0.5' VIEW POINT
	BROWN AND GRAY			1		PEL	LET:	EAL	AFTER PULLING THE
	CLAY, TRACE	5.5	5' 2777			İ			AUGERS THE HO E
	FINE SAND			<u> </u>					COLLASSED TO 13.5.
	(CL)	7.	7		72	TOP	OF SC	SEE/	
	,			=					PLACED SAND PACKTOSS
		=		E	جر إ	-504	ID PA	حد	PLACED BEATONITE TE AL
			£ .						TO 2.0'
i		13.5	5'	===					PLACED SAND TO 1.0'
174.2				==					SET PROTECTIVE STEEL
150	·	:		== :					COVER IN CONCRETE
							eex.		SEAL.
		:				Boe	E HOL	=	[
	IS.			<u> </u>	及文章	<i>x</i>		<u> </u>	
	LOOSE TO COMPACT			⇇≕					
	TAN FINE TO			E	X.				NOTE:
	MEDIUM SAND			<u></u>			APPEI	TER	ALL DOWNHOLE MEASURE
	TRACE SILT		_		m.200		тн		MENTS MADE WITH A
									WEIGHTED TAPE.
· ·			_				LAPS		
-	(SP)			<u> </u>		MAT	ERIA	_	WELL DEVELOPMENT NOTE
				===				<u></u>	
					100		1		915/85- SURGED WELL
					2				SCREEN THROUGHOUT
							}		PUMPED 30 GALLONS.
				E	Carr				SURGED BOTTOM 20 FEE
1		:		<u> </u>					PUMPED 20 GALONS.
									SURGED TOP 20 FEET
									PUMPED 30 GALLONS.
					4.				
									3
			272	Æ		<u> </u>		 	
i				1	** -]
						 			
				1==		1			}
		1 - 1 - 2 -	4			7:0	OF "	1 .	-
89.7		48.	4		15 6	ŧ .	OF M		
49.5	FIRM DARK GRAY CLAY	50	المناح				TOM (<u></u>	<u></u>
27 7	TRACE FINE TO MEDIUM SWO		51.5	N.W.	1	5 0	LINKS		}
51.5	(CHY	-	-	-		T FOO		┼	1
	BOTTOM OF HOLE AT				3				
		<u> </u>	1	i	!	1	<u> </u>	1	<u> </u>

MONITORING WELL INSTALLATION LOG								
GA INSP WIB' FALS DRILLING METHOD	HOLLOW STEM AUGER	WELL NO P-II SHEET 1 OF 1. GROUND ELEV 1379 WATER DEPTH 4.5 COLLAR ELEV 140.87 DATE/TIME 8/24/85 II DOAN ETARTED 9:50AM 8/24/85 COMPLETED 11:00AM 8/24/8 TIME / DATE						
	MATERIALS INVENTO	RY						
CASING TYPE SCH 40 PVC JOINT TYPE FLUSH THREAD TRI-LO GROUT QUANTITY	OC SLOT SIZE . OIO INCH	FILTER PACK GTY 7.3 FEET						
ELEK/DEPTH SOIL/ROCK DESCRIPTION	325 ABOVE GS -A STE	INSTALLATION NOTES PROTECTIVE ALL PVC AND FILTER BL COVER FABRIC WAS STEAM						

ELEK /DEPTH	SOIL / ROCK DESCRIPTION			WF	LL SH	ETC	H			INSTALLATION NOTES		
		.1		1				PEOT	KTIVE			
		325'44				15	TER	ے دو	JER	ALL PUC AND FILTER		
		30.45	XE (7)	1-7-	-17	7	80 6	x P	<u> </u>	FABRIC WAS STEAM		
							1			CLEANED PRIOR TO USE		
0.0	GROUND SURFACE			 		. <u></u>	, CARGE	ETE 1	EAL			
0.0			1.01							INSTALLED: 400 SCREEN		
	STIFF, LIGHT					-	SAL	•		12.0' CASING		
	BROWN TO		36	7777	777	77	1			05 WELL POINT		
	REDDISH BROWN	H		<i>////</i> // -	<i>\()//</i>			PATE !		AFTER PULLING THE		
						7 //		1		AUGERS, THE FOLE		
	CLAY, TRACE		7.0			-44				COLLAPSED TO 14.3'.		
	FINE SAND	El l	9.0			نام	130	ر ا	REBU			
	(CL)			-		\mathbf{S}_{-}	100	J= 3	200	PLACED SAND PACE TO TO		
	(32)	티		E		2 _	الممك	D PA	٠,	PLACED BENTONITE SEAL		
										πο 3.6'		
	Į.			E	=					PLACED SAND TO 1.0'		
122.9_			14.3	X 2 2			1	į	l l	SET PROTECTIVE STEEL		
15.0				交響於						COVER IN CONCEETE		
				E	=					SEAL.		
							1000	Ox. 8	<u>.</u> "			
	LOOSE TO COMPACT.	!			-3			≅ HOU		1		
	TAN FINE TO	El i		99.3								
	MEDIUM SANO					2				NOTE:		
	LITTLE GRADING	El I								ALL DOWNHOLE MEASURE		
	TO TRACE SILT	El l			===	2	2° F	c 50	REEN	MENTS MADE WITH A		
	3,2,				===	324 v	HITH	PED		WEIGHTED TAPE.		
	(50)			E			المت	H		WEIGHTED TAFE.		
	- ,	[- E				WELL DEVELOPMENT NOTE		
		<u> </u>								WELL DEVELOPMENT NOTE		
				2				APS ERIA		1 21-125		
									-	915/85- SUZGED WELL		
										SCREEN THEOUGHOUT		
•		El l					ł			PUMPED 30 GALLONS		
		 								SURGED BOTTOM		
				E	=			i		20 FEET PUMPED		
		H			==32					TO GALLONS, SUZGED		
		El l					1			TOP 20 FEET PUMPED		
										30 GALLONS		
					= 30					<u></u>		
		}					\rightarrow			1		
		El I						į		<u>]</u>		
		H			二、 缴	_				•		
		El I			-3%]		
		<u> </u>			=	113				4		
88.9		 		P . E	===]		
49.0	STIFF, BLACK CLAY	<u> </u>	1 265		~ /•	1	AUV	OM E	DENIX	1		
86.4	MEDIUM SAND (CH)	ti T			E.	פוד	OF					
51.5	BOTTOM OF HOLE AT	‡		51.5	<u> </u>		7	احلل		1		
-	51.5 FT.	<u>El</u>			_		TOM	OE NKS		1		
		FI I			1	اېحد	- CO	1	1	3		

		ING WELL INSTAL	-EATION EOU	
же не <u>553 3079</u>	PROJECT SODHEC/BIL	HEE RD /SC	WELL NO P-12	
GA MSP WITH FULL	DRILLING METHOD HOLLO	DW STEW WUGER	GROUND ELEV	- WATER DEPTH 6 55
WEATHER HAINLAND	_ DAILLING COMPANYTRI-	-STATE	COLLAR ELEV _139.3/_	- DATE/TIME 2/10/85 - Th
TEMP _70'F	DARL RIG CME CE	DRILLER DJ/RJ	STARTED 4 00 PM/B/ZE/05	COMPLETED 11 2000/8/10
			7 9212	TIME / DATE
		MATERIALS INVENT	TORY	

	MATERIALS INVENTORY		I^{\sim}
ASING TYPE SCH 40 PVC	SCREEN TYPE SLOTTED PVC. SLOT SIZE OLO INCH	INSTALLATION METHOD HAND POURES	
ROUT QUANTITY	CENTRALIZERS	FILTER PACK TYPE CHE POLEE FAIR SAND	
LEY/DEPTH SOIL/ROCK DESCRIPTION	WELL SKETCH	INSTALLATION NOTES	7.7
	3.7 ABOVEAS TOP OF PROTE	TINE	1

ELEV./DEPTH	SOIL / ROCK DESCRIPTION		WELL	SKE				INSTALLATION NOTES
		3.7 40VE	4.5	4	TOP C	F Pec	VER	ALL PUC AND FILTER
		35 ABOVE (s	74_		DF P		FABRIC WAS STEAM
				\top			}	CLEANED PRIOR TO
1359	GROUND SURFACE		1 1 1	11		l	11	USE.
0.0		0.5		100	1	t	ESEAL	
		1,91	77777	2	-54	ND	:	INSTALLED 400 STREET
	STIFF, LIGHT BROWN			<i>\\\\\\</i>	BE	7100	ITE .	9.5' CASING
1	TRACE FINE SAND	4.0	4444	11111			SEAC	3
	(CL)	6.0					KREEN	AFTER PULLING THE
6.5	(32)		<u> </u>	=	1	-	7	AUGERS THE HOLE
ر.ق		-		+ -	54	JO PA	CK !	
				∃ :		ł)]:	COLLAPSED TO 11.0'.
		1		∃~	1		 	
ļ	LOOSE, TAN FINE	11.0		- 1	4		:	PLACED SAND PACE TO 40
	SAND SOME SILT]		∃ •	}	-	 	PLACED BENTON ITE SEAL
	,			∄••			1	10 /.9'
120.9	(S M)					PROX		PLACED SAND TO 0.5'
15.0					1) 50	REH) E	SET PROTECTIVE STEEL
	,		• =	□劉朝	L	<u> </u>	↓ ↓	COVER IN CONCRETE
			• • • = =	3	Ĭ	[1	SEAL.
		[• =	3			X PEEN	
						APPEC	LTER	
						ФТН		NOTE:
							1	ALL DOWNHOLE MEASURE
						<u> </u>		MENTS MADE WITH A
								WEIGHTED TAPE
		El l			MA	TER	ED	
'								WELL DEVELOPMENT NOTE
			- =		Š		1	
		FI				 		9/5/85- SURGED THE
	COMPACT, TAN	E					1	WELL SCREN THROUGH
	FINE TO COARSE	 			-	 	 	
	SAND, TRACE SILT				3] [OUT HAND PUMPED
					4	 	┼	30 GALLONS, SUEGED
	(50)	:		7				BOTTOM 20 FEET
•	}					┼	 	PUMPED ZO GALLONS.
				3	1		1 1	SURGED BOTTOM 20
			September 1	_ 报. 沙 Nair(8)		┼	 	FEET, PUMPED 20
				5 🎎			1 1	GALLONS, SURGED TOP
•		 	7444	700EVB	 	 -	╂	20 FEET, PUMPED
	1	<u> </u>		日認	1			20 GALLONS SURGED
	l	 			A	+	+	TOP 20 FEET, PUMPEU
89.4		46.5		a	TIP	F W	LL	20 GALLONS.
46.5	STIFF, DARK	 		3,00	4	TOM	De l	1
	GRAY CLAY (CH)	[48.5		1			BORING	}
85.9	(CH)	<u> </u>	500	<u> </u>	1	<u></u>	1	\$
500	BOTTOM OF HOLE	El I		4-5	PT B	7 OF	.	<u> </u>
	AT 50.0 FT.		1				`	1
	1				[4
	1	! ! !	! !	1		i	1	1

	WELL NO P-13 SHEET 1 OF 1
GA INSP WIBL/ EWS DAILLING METHOD HOLLOW STEM AUGER	GROUND ELEV 139.6 WATER DEPTH 11.05
LINESTURE CLEAR DRILLING COMPANY TO	COLLEGE FLOW 147.69
TEMP 70° F DARL RIG CHE 55 DRILLER DT/RT	STARTED 8:3044/8/27/45 COMPLETED DION'8/2-E.
	TIME / DATE TIME / DATE

MATERIALS INVENTORY											
WELL CASING 2 m. dla 12.0 14	WELL SCREEN 2 m. dia. 40 11	BENTONITE SEAL 1.5 FEET									
	SCREEN TYPE SLOTTED PYC										
	SLOT SIZE OIO INCH										
GROUT QUANTITY	CENTRALIZERS	FILTER PACK TYPE CHEROKEE FA 13 SAND									
GROUT TYPE	DRILLING MUD TYPE	INSTALLATION METHOD HAND POURED									
	<u> </u>										

ELEV. / DEPTH	SOIL / ROCK DESCRIPTION			W	/ELL	SKE			INSTALLATION NOTES
		3.3 ABO	/E /- S			5	STEEL U	MECTIVE	ALL PUC AND FILTER
		- 400	VE G	15			TOP OF F	×c	FABRIC WAS STEAM
									CLEANED PRIOR TO USE
139.6	GROUND SURFACE		10'		-		PEONERE	& SEAL	Tricture To do al crafficial
	e		1.5	77777		,,,,,,	SAND	1 1	INSTALLED 400 STREEN
·	STIFF, LIGHT BEOWN		3.0				- REVIEW	SEAL !	12.0' CASING
	AND WHITE CLAY TRACE FINE SAND								0.5 VEH FUAT
	(CL)	-						+ +	AFTER PULLING THE
1 <u>53</u> 5,0	(00)					-5	-SAND PA	idra	AUGERS, THE FOLE
		-						+	COLLAPSED TO 15.4'
			B.9'	,			-702 05 3	CEEN	PLACED SAND PACK TO 3.0
ļ									PLACED BENTONITE
	LOOSE, TAN FINE								SEAL TO 1.5'
•	SAND, SOME								PLACED SAND TO 1.0'
	SILT	:							SET PROTECTIVE STEEL
123.1	(5M)	-	5:41		===	76/10			COVER IN CONCRETE
16.5		:					/ APPROX	ا بوا	SEAL.
					===	1	BOREH		
ļ			_		===				
1						船齡	2" PVC -	SPEEN	NOTE:
					==		WEADD WITH F	LITER	ALL DOWNHOLE MEASINE
						Y C	CLOTH		MENTS MADE WITH A
									WEIGHTED TAPE.
. [1	
					===				WELL DEVELOPMENT NOTE
							MATER		915/85- SURGED WELL
							~(2) = ~	ا _ ا	SCREEN THROUGHOUT.
.		-			==				PUMPED 30 GALLONS
i	COMPACT, TAN							1	SURGED BOTTOM 20 FEET
.]		 						 	PUMPED 20 GALLONS.
	FINE TO COARSE			6					SURGED TOP TO FEET
.	SAND TRACE SILT				==			+	PUMPED 30 GALLONS
	(50)			200				:	
.	(-)			20 HE	==		 -	+ /	
		-				7		 	
							1]
'		-			===			1	
								1	
•				*			 	1	<u> </u>
89.6		LI 1	19.4	٠.	=	J & /	BOTTOM	0=	}
50.0	STIFF DARK GRAY TO	 	جمح	and the second			·	1 - 1	
BBI	BLACK CLA (CH)	FI I		51.5		ri .	IP OF NE]
51.5	PORTON OF LINE AT	F(1							
	BOTTOM OF HOLE AT 51.5 FT.	-		 	1		T BORING		<u> </u>

MONITORING WELL INSTALLATION LOG									
JOB NO 853 3079 PROJECT SCHEC/BLUFF FD /SC WELL NO P-14 SHEET OF ' GA MSP WPL/FWS DRILLING METHOD HOLLON STEM AUGER GROUND ELEV 138.7 WATER DEPTH 10.7 WEATHER CLEAR DRILLING COMPANY TRI-STATE COLLAR ELEV 141.67 DATE/TIME 8/27/85 5:2570 TEMP 90° F DRILL RIG CME 56 DRILLER DV/RJ STARTED 4:35070/8/27/85 COMPLETED 5:3070/8/1/407 THE / DATE									
MATERIALS INVENTORY									
WELL CASING 2 M. ME 12.5 II. WELL SCREEN 2 M. GIO 40 LI BENTONITE BEAL 3 CASING TYPE SCH 40 PVC SCREEN TYPE SLOTTED PVC INSTALLATION METHOD HAD JOINT TYPE FLUSH THREAD TRI-LOC SLOT SIZE	S FEET N								

E) EU /655T.	SOIL /ROCK DESCRIPTION				<u> </u>	CVE	TCU			INCTALLATION NOTES
ELEV/DEPTH	SULL/MUCH DESCRIPTION	, ,		<u>, v</u>	YELL	SKE	OF F	1615/	IVE. I	INSTALLATION NOTES
		32 48	ove G	5.	1	550	EL C	VEZ.		ALL PVC AND FILTER
		BOA	DE G	2 3		13-1	DP OF	Puc		FARRY WAS STEAM
		E)	1	1				CLEANED PRIOR TO USE.
138.7	GROUND_SURFACE				L	 . 	(~)	CRETE	3541	
0.0		3 1	(. 5		1			1		
	STIFF, LIGHT	-					- 3A	40		TUSTALLED: 400' SPEEN
	BROWN AND		35	77777		77777	Be	ומסדוב	TE :	12.5' CASILYS
	WHITE CLAY	-						LLET		0.5 WELL POILT
	TRACE FINE	:	6.5		1		}			AFTER PULLIAKS THE
	(CL)	: 					ļ	 		AUGERS THE HOLE
	` '	:	95				TOP	- 3c	REEL I	COLLAPSED TO 13.0'
128.7					==		l	D Pa		<u> </u>
.0.0	LOOSE, TAN, FINE	:			===:		P			PLACED SAND PACK TO 65
	SAND SOME SILT (SM)	-	130					 		PLACED BENTONITE SEAL
	(SM)	:								то 3.5'
1237		-	15.0	-			SAP	PROX BORE	10 = 1	PLACED SAND TO 1.5'
15.0		:] [===					SET PROTECTIVE STEEL
		-						 		COVER IN CONCRETE
		:				•			:	JEAL.
		-					- 2"	PV S	WITH !	
		:			===			TERC		
				3	===			 		
		:		•]]:	NOTE:
		-		- 5						AH DOWNHOLE MEASURE -
		=			E==				:	MENTS MADE WITH A
		-			<u> </u>			├		WELL DEVELOPMENT NOTE
		:			<u> </u>				:	WELL DEVELOPMENT NOTE
	·	-				4		ATER		
		:				14				915/85 SURGED WELL
		-		2.00		今日日本日		 		SCREEN THROUGHOUT
ı	-	:			E				:	PUMPED 30 GALLONS.
	·	-					ļ	-		SURGED BOTTOM 20
		:			<u> </u>					FEET PUMPED 20
		-								GALLONS SURGED TOP
	COMPACT, LIGHT	:			===		}	1	:	20 FEET PUMPED
	BROWN, FINE TO	-								30 GALLONS.
	COARSE SAND	:				经企业				
'	TRACE SILT	-		-				+		
	TRACE FINE CREWEL	:								
•	(sp)	-						1		
									:	
•		-			E			 		
887					E	1 3	عظٍ ہ	TONE	<u>م</u> =	
500 B72	STIFF GRAY LIAS (CH)	-	500	jacitoj 		-	ابکے کیا احجاد		- KNG	
51.5	BOTTOM OF HOLE AT		•	\$1.5	1000	ı	1	10=		
_, _,	51.5FT.	-		 	+	→ SF		PEIN		
1	}	[]		;	1	J	j	ļ	i [:	}

	MON	TORING	WEL	L IA	JST/	LL	ATIC	N L	OG				
108 NO 253-3079 PROJECT SCOHEC/BLUFF RD /SC. DELL NO P-15 SHEET ' OF '													
GA WISP WIBL DRILLING HETHOD HOLLOW STEM AUGER GROUND ELEV 137.60 87													
TEMP85	ORILL RIG CME	55	DRII	LLER_C	D/R	<u> </u>	START	109:32	044/9/4/85 COMPLETED 11.17) 4/4/4/85				
TIDE / DATE TIME) DATE													
MATERIALS INVENTORY													
WELL CASING 2 h.dis 11 12 WELL SCREEN 2 h.dis 40 IL DENTONITE DEAL 3.0 FEET													
CASING TYPE SCH 40 PVC SCREEN TYPE SLOTTED PVC INSTALLATION METHOD HAND POLEED CONTINUE TYPE FLUSH THREAD TRI-LOC SLOT SIZE OLD INCH PUTER PART OF SO FEET													
DEGIT SIZE													
	_								1/				
GROUT TYPE BRILLING MUD TYPE MISTALLATION METHOD HAND POURED													
				=				==					
LEW/DEPTH	SOIL /ROCK DESCRIPTION		A	VELL					INSTALLATION NOTES				
		3.1'ABOVE 6.5				50	- PRO	ECING VER	ALL PYC AND FILTES				
		294800	1 _1		=	İ		1 }	FABRIC WAS STEAM				
						~102	OF P	YC	CLEANED PRIDE TO USE				
137.6	GROUND SURFACE												
0.0		1.0		1	عات	COV	RETE	SEAL	INSTALLED: 40.0 SCREEN				
ļ	LIGHT BROWN				: -> e	-344	D		11.0 CASING				
	CLAY, TRACE	3.0	7///			GEN	TON IT	E	0.5' WELL POILT				
	(CL)	 				PELL	ET S	EAL	AFTER PULLING THE				
	()	6.0	W/W		uud				AUGERS THE HOLE				
130.1		F 8.1'			-	700			COLLAPSED TO 11.0'				
7.5	TAN FINE SAND				"2	-341	D PA	ا ا					
	SOME SILT	[PLAKED SAND PRICETO 600				
	300	11.0	9		<u>م</u>				PLACED BENTONITON ITE				
			1 - V		10	-			SEAL TO 3.0				
1776		El			•				PLACED SAND TO 10'				
122.6 15.0	· · · · · · · · · · · · · · ·								SET PROTECTIVE STEEL				
			0 0		9	/Λτοσι	20X. 8		SEAL.				
		E			1		EHOL		1				
		:				7			1				
			6 4										
					A 7				NOTE				
		H	0 0						ALL DOWNHOLE MEASURE				
			8	===	4	2 0	۷ یا ح	REEN	MENTS MADE WITH A				
		El I	a a		أكوط	WIT		TER	WEIGHTED TAPE.				
		<u> </u>	L 0 .		4504	ما	TH		THE PENEL OF MENT NOTES				
		Fl l			00				WELL DEVELOPMENT NOTES				
			20.0						10/5/05				
		El l	A		. 0	•			9/5/85-5-18GED V.E.L				
		H +					APSE		SCREEN THROUGHOUT				
		El l	A S		#				PUMPED 30 GALLONS. SURGED BOTTOM 20 FEET				
	COMPACT THE	 			51.0				PUMPED 20 GALLONS				
	COMPACT, TAN	[]	00		TO TO				SURGED TOP 20 FEET				
İ	SAND, TRACE	El	0.8		**				PUMPED 30 GALLONS				
	SILT		0.0	⋿≣	Qui B								
	(5)	[9 - 0						1				
			10 5		6.7								
									3				
		FI							1				
		<u> </u>			100								
89.6		H			1		<u></u>		1				
	<u> </u>	اسمدأ ا	U.S. / 9		1000		TOM.	DEINK	9				
480	STIFF, GRAY CLAY	1 225	1	0	7	AUG	DE & G	DE VICE					
	BOTTOM OF HOLE	48.5	49.7	2.	2	P OF		CRING					

		TORING							
JOB NO 853	-3079 PROJECT SCOH	EC/BLUFF	RD/	5C			WELL	NO	P-16 SHEET OF
GA MSPX	DAILLING METHOD	HOLLOW ST	EM .	ΔU(JE	2		_ GROU	ND ELEV	138.5 WATER DEPTH 10.3
WEATHER	DRILLING COMPANY_	IRI-STAT	E		_		. COLL	AR ELEV	19438 Aver 1941 - 014/00 00 1
TEMP 90	OREL RIG CME E	6	ne.)J/8	·	_ START	eo <u>4.30</u>	PM / 9/4/85 COMPLETED = 14.1 10.4 5.5
								7 11	HE / DATE COMPLETED THE / DATE
		M	ATER	IALS	INVE	NTO	RY		
WELL CASING	2 m.en 13.5	-I.L WELL SCR	FFN	2	_ in. dia.	40)	LF BEN	TONITE SEAL 2.5 FEET
CASING TYPE	SCH 40 PVC								ALLATION METHOD HAND HOURE
JOINT TYPE E	FLUSH THREAD TEL- LOC	SLOT SIZE		,010	اماد	н		FILT	TER PACE OTY 7.5 FEET
	ITY	CENTRALIZ	ERS						ER PACK TYPECHEROMEE FALL SULLE
GROUT TYPE_		- DRILLING N	IUD TY	٠٤ ـــــ				INS	TALLATION METHOD HAND FOURE!
ELEV. /DEPTH	SOIL / ROCK DESCRIPTION	γ	1/	VELL	SYE	TCU			I WETALL ATION NOTES
ECENTORFIA	50.67.000 0000	<u> </u>		YELL			± 000	ECTIVE	INSTALLATION NOTES
		32 ABOVE	s <u>}</u>	ļ	ية كميل	TEEL	∨ ص ا	EQ	ALL PYCAND FILTER
5		2.9.46 VE (1.5	12/	-	7	Toe	OF P	YC.	FABRIC WAS STEAM
138.5	CONTROL SUBSTICE	El I	1 1	1			Į	} {	CLEANED PRIOR TO THE
0.0	GROUND SURFACE	[-	L CON	CRETE	SEAL	<u></u>
E	FIRM, LIGHT BROWN		77777	1		- 30		7	TADIALED 400 C. CET
-	AND WHITE CLAYEY	H - 1 - 2 - 2 - 2 - 2 - 2				BEN	TON IT	=	13.5 0/211/1/4
ŧ	SET LITTLE FINE	4.5		1		-PEL	FF S	EAL	<u> 0.5 พ.ฮ.ป. คือ ก</u>
-	SAND (ML)	H					<u> </u>	 - 	15-0 5 1 1 1 7 -
	(~~= /]		AFTER PULLING T-E
-						34	D P4	<u> </u>	AUGEES, THE HOLE
		<u> </u>							COLLAPSED TO 12.0'
127.5		106				TOP	OF S	PEEN	PLACED SOND PACKTO 4.5
11.0		12.0			6/				PLACED BENTONITE SE AL
-		El i –			4		<u> </u>		TO 2.0'
									PLACED SAND TO 1.0'
			0 0						SET PROTECTIVE STEEL
	COMPACT, TAN	 		===		ΔΘΘ	Pox.	8.	COVER IN CONCRETE
	FINE TO MEDIUM		1 9				ZEHO		SEAL
	SAND LITTLE					μ			
-	TO TRACE SILT		9.4						
	(5P-SM)		•			2"	evc s	PE	NOTE:
	70				6 1	We	PPE	1 [ALL DOWNHOLE MEASURE
	(SP)					_ <	774	TER.	MENTS MADE WITH A
	• •	:	2 2						WEIGHTED TAPE.
-	,		٠.,				<u> </u>		
			•				l	1	WELL DEVELOPMENT NOTE
-						جع	APS	ED	
						MA	FERI		9/5/85 - SURGED NEW
<u>-</u>								 	SCREEN THROUGHOUT
							{		PUMPED 30 GALLONS.
-		 	•		7 (4.0) 7 (4.0)				SURGED BOTTOM 20 FEE
									PUMPED 20 GALLONS
- 1					2		 	 	SURBED TOP 20 FEET
									PUMPED 30 GALLONS.
-		 - -						 	
	, 								
		 					 	 	
							}		
								 	<u> </u>
						l	}] }	
-					W. 7		<u> </u>		
49.5	STIFE DADY (CA	49.5				الكتار	EZ B	PE NG	
87.6	STIFF, DARK GRAY CLAY		50.9		TI	OF	MELL		
50.9	BOTTOM OF HOLE AT 50.9 FT.		21.1,	1			}		=
	~. ~ . / = 1.				SHEL	By T	NOE		
						<u> </u>			1

GA INSP AES DRILLING METHOD HOLE WEATHER FAIR DRILLING COMPANY THE	OW STEM AUGER GROUND RI-STATE COLLAR	ELEV 134.7 WATER DEPTH 6.57' ELEV 137.59 DATE/TIME 12-4-85/2 COMPLETED 10.45 / 11-15-85 TIME / DATE
	MATERIALS INVENTORY	
CASING TYPE SCH 40 PYC SOINT TYPE FLUSH THREADED GROUT QUANTITY	SCREEN TYPE MILLED SLOT PVC	FILTER PACE GTY 280 #

		- DRILLING MUD TYPE		ALLATION METHOD TAND POCKED
ELEV./DEPTH	SOIL / ROCK DESCRIPTION	WELL	SKETCH	INSTALLATION NOTES
			TOP OF PROTECTIVE	ALL PIC AND FILTER FABRIC
		32'ANVE6.5.	TOP OF PV4	PRIOR TO USE
134.7	GROUND SURFACE	(4) (2)	COLCRETE	INSTALLED; 100' SCREEN
	AND SILTY CLAT	2.0	COLCRETE SEAL	10.2' CADILICA
	(3-2)		PELLET SEAL	AFTER PULLIAK- THE
		57	TOP OF	AUGERS THE HOLE
•		7.0	SCREEN PACK	PLAND SAND PACK TO 7.0"
1247	LOOSE GRET SUG-TY			PLACED BENTON TE SEAL
	MICACEDUS FINE TO	12.0	CAPPROX B	TO 2.5 PLACED 5AND TO 2.0
	SILT. (SP)		2 OK SCREEN	SET PROTECTIVE STEEL
-			WRAPPED WITH	COVER IN CONCRETE SEAL NOTES: FILTER FABRIC
_		17.5	MATERIAL TIP OF WELL	RULLED OFF AT SCREEN
1157	BOITOM OF HOLE	19.01	AUGER BORING	ALL DOWNHOLE
	AT 19.0			MEASUREMENTS MADE
-				TAPE.
_				
-	·			WELL DEVELOPMENT NOTES
				11/16/85 SURGED WELL SCREEN THROUGHOUT
				PUMPED 30 CAL.
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же но <u>85</u>	3-3079 PROJECT SCOHEC	/ Due	F RD	13.C				WELL	NO	نــــ	5-18	_ 9HEET _	1 0!	i
GA INSP	AES DRILLING METHOD	OLLOY	V ST	EM	AUG	ER		GROUN	D ELEV	_	139.2	_ WATER A	IA	50
WEATHER SLS	DUDY DRILLING COMPANY_	TRIT	STAT	<u> </u>				COLLA	M ELEV		141.98	_ DATE/TIM	E 11-15-85	ري در/ع
TEMP	DANL MG CME	55		DRII	L ER	JOK.	ES	STARTE	<u>10 8:0</u>	0	<u>/11-13-85</u>	- COMPLET	ED 12 (2)	11-13-55
		===	==							=	/ DATE		THE	/ DATE
<u></u>					IALS									
WELL CASING.	2" m da 12.75	_1.6 WE	LL SCRI	EEN	2	in. dia.	40		IF BEN	NTO	NITE SEAL.	50 = 1/	Z"PEL	LETS
CASING TYPE_	5CH 40 PVC	SCF	REEN TY	PE MI	LLED	صاک	PY		INS	TAL	LATION MET	HOD HAN	AD POU	IRED
JOINT TYPE	FLUSH THREADED	SLO	T SIZE		0.02	" ص			_ FILT	TER	PACK OTY.	350		
GROUT QUANTI	ITY	CEN	ITRALIZ	ERS					FIL1	TER	PACK TYPE	CHEROKE	€ FA 13	SANC
GROUT TYPE_		DRIIL	LING M	UD TYP	ε	_=_			_ INS	TAL	LATION MET	HOO_HAN	D POU	REC
{														
										T	1310000			
ELEV./DEPTH	SOIL / ROCK DESCRIPTION			W	/ELL					+	INSTA	LLATIC	N NO	TES
E i							OP OF	200	ECTIVE E	1	ALL PYC	AND F	LTER F	MBRIC
-		275' 4	BOVE			4	ם פסד	- 577		4	NAS STEA	AN CLE	ANED	<u> </u>
E		G.S.				9-	2000		1 1	1	PRIOR -	10 1156	<u> </u>	
139.2	GROUND SURFACE		0.2				- C - C			4				
0.0	COMPACT GREY TO RED-BROWN FINE		1.5					alest Al		[]1	CUSTAL	LED: 4	OD'54	PEEN
<u> </u>	SAND , SOME SUTY	 					<u>_</u> \$4	מא	 	1			75'CAS	
<u> </u>	CLAY (SC)	E						الحوال]_			5'WELL	- POINT
<u>}</u>		 					PEL	LET	DEAL	17	AFTER I			
F 1		[]]}_	AUGER:	S. THE	HOLE	<u> </u>
!			7.4'					2OF			COLLAPS	ED TO	13.0	
[]		E))					20	REEN	,]_				
! !			<u>' م</u> .ما				- 344	D PA	<u> </u>		PLACED	SAND	PACLT	D 7.4'
[]_	PLACED	BENTO	NITE	
!			13.0						<u> </u>		PELLET !			
124.7		E))	. 20							1	PLACED	SAND	70 4	2.2
-145	LOOSE GREY THE TO									1	DET PR	ZOTELT	IVE ST	EEL_
[\ \	COURSE SAND, TOKE					٠				1	COVER	IN COV	CEFTE	SEAL.
<u> </u>	TO LITTLE SILT, TRACE TO LITTLE FILE GRAVEL	 					APP	DX E	-	#				
!	(SP)						7-20-		_	1				
<u> </u>	C /			٠,		2000				1				
;				• . •		•				}-				
[2" A	PPED	EEN.	1	NOTE:	ALL DO	DWNFK	OLE_
[3	-	TER		MEASU			
<u> </u>										L	WITH A	WEIG	HITE D	·
t 1		티 1								1	TAPE			
F				\$32.00						1	WELL DE	VELOR	MENT	NOTES
f {		i 1		У.						H				
F 1								LAPS		1	11/14/85			
!				•					Γ Ι	╂	SCREEN			•
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E I			50.5	•	AP Sec.					1				
869			52.3				,BO	TOM	DF	4				
52.3	BOTTOM OF HOLE			 	i		AV	EE &	PIK	H				
	AT 52.3 FT	L1 /		1	Į	1	ı	:	1 .	-رز≀				

		TORING									
лов но <u>853</u>	-3079 PROJECT SCOHEL	BUFF RO	/5.4				WELL	NO	P-19	ture.	1 1
GA MSP	AES DRILLING METHOD F	torrow 5	TEM	Aure	ı Q		GROUN	D ELEV	137.6		
I wearnes Ca	OUDV MAILING FOMMANY	TD: STA	_						سام صد		1.1
TEMP 6	O 5 DARL RIG CME	2			عدود	5	START	10 2 00	Introles		- 3 - 11/10/05
							_	Y as	t / 847t	COMPLET	TIME / BATE
			MATER	IALS	INVE	NTO	₹Y				
WELL CASING	2" N 44 BO							1 BEN	TONITE SEAL	25 = 1/2	" CPLLETS
CASING TYPE	SCH 40 PYC	SCOCEN		1111 55		T PYC		INST	ALLATINH MET	400 HALL	20000
	FLUSH THREADED										
	ITY										E FA 13 SAND
GROUT TYPE_											10 POUCEU
<u> </u>				· · · · · ·							, <u>, , , , , , , , , , , , , , , , , , </u>
ELEX/DEPTH	BOIL / ROCK DESCRIPTION		1	NELL						LLATIC	N NOTES
ļ				Ţ		DP OF		CTIVE	ALL PVC	AND FI	TER FABRIC
Ŀ		34'ABDE	•\$. - *			700			7		EANED
‡	Ì			1	ΙT				Peroe		
137.6	SROUND SURFACE			<u> </u>					1		
0.0	COMPACT BLLOW BOWN FIRE SAND, AND SILTY	1.5		}		cox	PETE	SEAL	INSTAI	LED 4	OO' TREEL
Ę.	CLAT, WITH PACKETS OF	1.75	711111	3	777777		<u> </u>	1 1			3.0 CASING
ŧ	GREY PINE SAND, TRACE	3.5	• //////	4		Pe	LLET	FEA.	} _		0.5' WELLPOIN
E	(sc)	4.6	,		200	-TOP	OF S	REEN]		
,				==			1	1 1	AFTER	Pulls	16 THE
E				==	-	Z_3A	UD PA	er	AUGERS	S. THE	HOLE
ŧ	!			===	7		}	1 1	COLLAP	SED TO	10.31
E		103					<u> </u>				····
ŧ]= <u>=</u> =				\ \	PLACED 3	AND PAL	r to 3.5'
[4	_ (100 m)	===			PROY		PLACED	BENT	WITE SEAL
<u>}</u>				==)≃	REHO	E	10 1.7	5'	<u> </u>
- 123.1 - 14.5	LOOSE LIGHT GREY		_		11.5				PLACED	SAND	TO 15'
ŧ	FINE TO COARSE SAND					- 0"		ll	SET	ROTEL	TIVE STEEL
-	TRACE TO LITTLE CLATET		7,000	 ===		- We	APPE	PEEN	COVER	IN CC	NCRETE
ł	SILT (SP)					4 WI	THE!	TER	SEAL.		
1			2.00	1==	2/1		Ι		NOTES:	FILTER	FABRIC
	,			1===	CI C						E UPPER
ļ		 	21.5								DURING
[El		亖			ł		INSTAL		
}		<u> </u>				مير	PERM	ED	J		MEASURE-
ŧ .				}==	3		ERIZ	1			WITH A
ŀ			2/2/				 		WEIGH		
Į.				}==		1					MENT NOTE
<u>F</u>].		- 32	.		 		 	WEUL.	NOT	DEVELOPED
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F		1 45				TIP	DE W	ELL.	1		• _
‡		<u> </u>			1.4				1		
F	1	ET T		1		1			1		
67.6	1	 		1					1		
95 B7.1	STIP VERY DARK GRAY	50	5				MON I	OF DEVIS	ΞΕ	***	
Į.	BOTTOM OF HOLE	F	-	1		~.	- '	1	4		
F	AT 50.5 FT.								1		
ŀ	1	FI I			l l	1	1	1			

	MONI	TORI	NG	WEL	LIN	IST	ALLA	1710	N LC	DG
лов но. <u>85</u> 3	3079 PROJECT SCOHEC	/ PLUE	FP	0/5.0				WELL	wo	P-20 SHEET 1 OF 1
64 MSP	ES BRILLING METHOD HO	WOW	STE	M Act	OFE			-	ELEV.	197.0 WATER BESTER II BO
WEATHER BA	AIN DRILLING COMPANY_		TATE	<u> </u>				COLLA	R ELEV .	139.95 MTE/THE 11-21-55/12:10
11.00	DRAL RIG COME S	13		DAIL	LER_P	אסע	<u> </u>	STARTE	700	/11-21-85 COMPLETED 12:10/11-21-8
			MA	TERI	ALS	INVE	NTOF	RY.		
WELL CASING	2° n.dh 20.0	.1.1 WE							I BEN	TONITE SEAL SO # 1/2" PELLETS
CABING TYPE_	SCH AO PYC	SCF	REEN TI	PE MI	LED	30	_24		_ #4817	ALLATION METHOD HAND POURED
JOINT TYPE	FLUSH THREADED	\$10	T SIZE		0.0	220	<u>'</u>		_ FILT	ER PACE OTY
GROUT TYPE										ER PACK TYPE CHEROME FA 13 SAND
GROUT TYPE_		PN	LLING M	NO TYP	٠					TALLATION METHOD HAND POLIPED
ELEY DEPTH	SOIL / ROCK DESCRIPTION			W	ELL					INSTALLATION NOTES
							POF		EZTIVE IR	TOPE PYC AND FILTER MON
<u> </u>	!	6.3	BONE	7		4	TOP	F PV	2	WAS STEAM CLEANED
157.0	GROUND SURFACE					1				PRIOR TO USE.
0.0	STIFF LIGHT GREY TO	E	-	. 1			CO	ØP.	E	THOTALLED: 30.0' SCREEN
F	RED-BROWN SILTY		25				1 5	CRET		200'C43ING
F	COURSE SALLO	-	-3	£ .			1	712		OS'MELL POIN
Ł	(CL)						ł			
	,		5.7							AFTER RIMNETHE
		<u> </u>	ļ		\Box		- Be	TOT	TE SEAL	AUGERS, THE HOLE
			Ì					CE!	360	COLARDED TO 16.0'
F			10.0.				1		\vdash	PLACED SAND PACK TO 10.
ł	,					20.8	بوا	LID PA	ارا	PLACED BEUTONITE SEAL
<u>t</u>						20				TD 5.7
È										PLACED CUTTINGS
			160	100			_TO			то 2.5′
1195		FI	16.6				1 0	- C- 9		SET PROTECTIVE STEEL
175	LOOSE LIGHT GRET	E					4			COMP IN CONCRETE SEA
-	TRACE TO LITTLE PINE TO MEDIUM GRAVEL		-			(Care	APP	ROY	<u>e</u>	WEAPPED WITH FILTER
	TRACE TO LITTLE SAT	E	1							FABRIC.
<u> </u>	(SP)	<u> </u>		X.				t		ALL DOUBHOLE MEASURE
Ł			ł	3.86			1-2"F	VC SC	EEN	MENTS MADE WITH A
F				系统			We	H FIL	ED	WEIGHTED TAPE.
-		FI	<u> </u>			-85		ТН		
•		Ē			===	盛	3			WELL DEVELOPMENT NOT
F		 	-				2			WELL NOT DEVELOPED
Ì		El						EPI		
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130.2 13	FRIT MEDIUM GARY MIACUMI	ŦI					-	L		}
870 500	BOHOM OF HOLE	-	50.0	7.4		10000	Α A	JGE	4	
	AT 50 OFT	E				}	5	OR NO		3
F		ET	1	1	† -			1		

	WIND MEET MADINE	
OO HO 659 3079 PROJECT SCOME / B	-ON STEW ALLERO ADDISO	D-21 SHEET OF P
WERNER FAIR DAILING COMPANY	TRI- STATES COLLAD	FLEV _194.67
EOP 40 \$ BRALING CME	S BAILLED RIGHT STARTED	1:45 124-85 COMPLETED 3.0c 12-4-85
·	MATERIALS INVENTORY	
WELL CABRIG 2" 00 00 12 11	DELL BEREEH 2" D. GD. 42 11	DENTEMITE 8041 25 - 1/4" AUTS
CABIRE TYPE SCH 40 PVC	SCREEN TYPE MILLED SLOT PYC.	MISTALLATION MITHOD HAND POURED
DINT TYPE FLUSH THE CADED TO LON WEAPPED	SLOT BIZE _0.010"	FILTER PACE STY
GROUT BUANTITY	CENTRALIZERS	PILTER PACE TYPE CHEROKEE FA 13 SAND
SAOUT TYPE	EXTTEND MIND TANE	MOTALLATION METHOD HAND POLICED

LEK /DEPTH	SOIL / ROCK BESCRIPTION		₩ELL	-				INSTALLATION NOTES
	<i>.</i> `	4.0 400		223 TU	130 130			BLL PK AND FILTER PABRIC
		6 5						WAS STRAN CLEANED
		:			} }			PRIOR TO USE
137.7	SECURID SURFACE			11_				3
0.0	STIFF MOTTLED ORANGE	: I .	<	4		M COL	TE	INSTALLED: 40.0' SCREEN
İ	SUT CLAY GOME PINE	2	5	iiiiii	- 9	<u>عدہ</u>		12.0'CASING
,	gamo (CL)	: [=	NTON	ine	D.S'WELL POIN
	(-2)					ELLEY FALLEY	I	AFTER PHILING THE
		6	.0'			OF		AUGERS THE HOLE
	·			7		EN		COLLAPSED TO 12.5'
,		8	0	1:3	-5	ND CK	}	4
27.7				226		<u> </u>		PLACED SAND PACK TOGO
ρ Q.	COMPACT ORANGE BROWN MICACEOUS				1		{ {	PLACED BENTOMITE SEAL
	PINE SAND, SOME TO	12	2					TO 2.0'
	LITTLE CLAYET SILT			9-			1	PLACED SANDTO 1.5'
	(sm)	<u> </u>]		<u> </u>	SET PROTECTIVE STERL
					AP	PROK	b 0	COVER IN CONCRETE
70.Z				200	₽	ZEHOL	£	SEAL.
7.5	COMPACT TO LOOSE FINE TO COARSE			1]
	SAND, TRACE SILT				2:	PK-	CEEDU	3
	(5P)					TH FIL		1
	しつり				_ =	OTH.		MOTE: ALL DOMANHOLE
ļ							i '	MEASUREMENTS MADE
		H	_	100				WITH A WEIGHTED
								TAPE.
		╡	_		مور	TERIA	23	
					****	16610		WELL DEVELOPMENT NOTE
,		╬—-}-	_					WELL NOT DEVELOPED
							1 1	
								3
							[}
		 					 	<u></u>
				13,0				}
		 						
							}	
		}						1
					4			
				100	}	<u> </u>		9
	(10.20				}
						<u> </u>	 	3
*						i		}
89.5 8.2		- las	30		T.0	OF 160	 	
	SETY CLAY SOME FOR	[]	12			1004	Œ	3
88.5	SAUD CLAY SOME FOR	H 	- - -	+	1		OZINO	H
49.3	BOTTOM OF HOLE AT 49.2 FT.	E						₫
	7.6Th	├ ┤──┼─	- 		 	ļ	 	H
	l .	F1	1 1	1	,	:	1	I -1

JOB NO 853 3079 PROJECT SCOHEC/BLUFF RD /5.C	WELL NO P-22	SHEET OF
GA MSP AES DRILLING METHOD HOLLOW STEM AUGER	GROUND ELEV _137.8	WATER REATH 17 0.4
WEATHER COOPENY DILLING COMPANY ID - STATE	COLLAR ELEV	BATE / 1119 BE / 12 40
TEMP 70'5 DRILL RIG CME 55 DRILLER D.JONES	STARTED 9:30 /11-19-80	COMPLETED 11 30/11-19. 05

	MATERIALS INVENTORY	
WELL CASING 2" In dia 17.7 1.1. CASING TYPE SCH 40 PVC	WELL SCREEN 2" M. die. 35 LE SCREEN TYPE MILLED SLOT PYC	BENTONITE SEAL 50 = 1/2" PELLETS
JOINT TYPE FLUSH THEEADED	SLOT SIZE 0.020" / 0.010"	FILTER PACK OTY 200 #
GROUT QUANTITY	CENTRALIZERS	FILTER PACK TYPE CHEEDKEE FA 13 SAND
GROUT TYPE		

ELEV /DEPTH	SOIL /ROCK DESCRIPTION	WELL SKETCH	INSTALLATION NOTES
		STEEL PROTECTIVE	ALL PYCAND FILTER FABRE
		34'ABOVE'S TOP OF PUL	WAS STEAM CLEANED
			PRIOR TO USE
1378	GROUND SURFACE		
0.0	DENSE TO LOCSE	1.0 MM SECRETE	INSTALLED: 300' SCREEN
	AND CLAYEY SILT		(0.010" SLOT SCREEN 14.3".
	(54)		19.3'
		SAUD	0.020"SLOT SCREEN 19.3"
		6.0'	49.3')
		BENTON TE	10.0 CASING
		FELLET SEAL	0.5' WELL POIN
		9.5	AFTER PULLING THE
		SAND PACK	17
		12.5' TOP OF	COLLAPSED TO 12.5'.
		14.3'- SEREEN	PLACED SAND PACK TO 9.5
5.0'	COMPACT TO LOOSE		PLACED BENTON ITE SEAL
	LIGHT GRET FINE TO		TD 6.0'
	CDARSE SAND, SOME	三	PLACED SAND TO 1.0'
	CLATET SILT		SET PROTECTIVE STEEL
	(SM)	APPROX B'	COVER IN CONCRETE DEAL
			NOTES: SCREEN NOT
			FILTER FABRIC WRAPPED.
			ALL DOWNHOLE MEASURE
	Committee of the commit	-2" FVC SCRE	EN MENTS MADE WITH A
		WEAPPED WITH FILTER	WEIGHTED TAPE.
		CLOTH	-
			WELL DEVELOPMENT NOTE
1078			WELL NOT DEVELOPED
30.0	COMPACT TO LOOSE,		3
	LIGHT GRAY FINE	COLLARSED	
	LITTLE CLAYEY SILT.	MATERIAL	
	(SP-SM)		
	()		
			=
	Service Black All		=
	CALL TO THE STATE OF		
			1
	and the same		1
89.8	BUNK MINES	TIP OF WELL	
	BLACK MINGO CLAY	46.8	
863	(5.7)	-BOTTOM OF	
51.5	BOTTOM OF HOLE AT	51.5' AUGER OR	ine:
	51.5 FT.		1
			1

лов но <u>853-3079</u>	PROJECT_ SCONEC /BLUFF ROAD /SC	WELL NO PW1 SHEET 1 OF 1
SA MEP AES	DRILLING METHOD MUD ROTARY	GROUND ELEV 1369 WATER DEPTH -
WEATHER CLDY	MONITOR PROPERTY (ICO (- L-) - 1	
TEMP 60'S	DRILL RIG CME 55 DRILLER D. JONES	STARTED 5:00 2/05 COMPLETED 10:00 2/08/1-

	MATERIALS INVENTORY	
CASING TYPE 2 PVC JOINT TYPE FLUCH THEEADED GROUT QUANTITY I SACKS GROUT TYPE 75 GAL. H20 . I SACK	WELL SCREEN 2" m. die 20 LI SCREEN TYPE PVC SLOT SIZE 0.020" CENTRALIZERS STEEL SPRING DRILLING MUD TYPE 50 QUICK GEL: ~ 200 GAL HEO	FILTER PACK TYPE QUIKETE ALPURTON SH

ELEY/DEPTH	SOIL /ROCK DESCRIPTION	WELL	SKETCH	INSTALLATION NOTES
				DRILLED 9"HOLE TO 51,
		LOCK NO STEL	TOP OF PVC	SET AND CROUTED SURFACE
	[COVER	2.5 ABOVE 05.	CASING USING A SACKS OF
136.9	GROUND SURFACE		APPROX 9"	CEMENT DRIVED 5"HOLE
0.0	REFER TO BORING	Hit.	BORING	TO 144 DEPTH HOLE
	BP-Z FOR STRATIGRAPHY			COLLAPSED TO 118 FT BEFOR
	ROM 0 10 49 FT.	13 83	CENTRALIZER	WELL COULD BE INSTALLED
	-			PLACED 25 LBS BENTONITE
	F			IN LOWER SEAL INSTALLE
			-ZøPVC	PVC SCREEN AND CASING.
	F		CASING	RACED SAND PACK.
	E			
		A SE	GROUT CROUT	
	-			HOUR TO REMOVE FINES
	1		CASING GROUT	AND DRILLING MUD.
				PLACED UPPER BENTONITE
			6 SIEFACE	PELLET SEAL GROUTED
		50	CASNO	AROUND 2" CASING TO
		No.		SURFACE USING 7 SACKS
78.9	BECON SAMPLING AT 58			OF CEMENT, INSTAULD
58.0 GE	AY SILTY CLAY SOME			STEEL WELL COVER.
15.9 FIN	AY SILTY CLAY SOME			
	TON FINE SAND,			
70.0	SOME SILT (SM)			
10.0	THINLY BEDDED FINE			
	TO MEDIUM SAND,	79.0		
	SOME SILTY CLAY.	177	BENTONITE	
	(SM)	1 1//	PELLET SEAL	WELL DEVELOPMENT NOTE
	[88.0	Z'S PK STEEL	
90.0	THINLY BEDDED	905	E PA	
	FINE TO MEDIUM			PLMP 25 gpm FOR 2 HES.
	SAND, SOME SILTY	400	SWD PACK	
	CLAY. (SM)			
			SOTTOM OF	
26.9		109.5		
110.0	CRAY AND TAN SUTY		BENTONITE	
	1			
	Sand (CL)	110		
10.4				
126.5	MOTTLED WHITE; PINK	256	MATERIA C	
	MOTTLED WHITE; FINE AND LAVENDER FINE TO MEDIUM SAND, SOME SHOT, (SM)		DEILLING MUD	1
134.5	BROWN FINE TO MEDIUM	200		
-3.1	SAND, TRACE SILT (SP) !]
140.0	LITTLE FINE SOND. ICLY			
144.0	BOTTOM OF HOLE 144.0]
			BOTTOM OF	13
			HOLE 144.0	1
The state of the s				7
				1

MONITORING WELL INSTALLATION LOG													
DE NO BES - 3079 PROJECT SCHEE / BUIR ROAD / SC WELL NO DW Z SHEET OF THE													
GA MSPA	ES DRILLING METHOD	Mup	ROTA	LEY					6	ROUNI	D ELEV	1372	
	WESTHER DRILLING COMPANY GEO CONSTRUCTION TESTING COLLAR ELEV 140.3 DATE/TIME												
TEMP	DRALL RIGCME	<u>-5-2 </u>		DR	ILLER	₽	١٥٨	IES_	51	TARTE	0 12 5	2/23/05 COMPLETED 12:00 2/4/09	
					_				==		====	THE / BATE	
				ATER									S
WELL CASING		_1.1 WE	LL SCR	EEN _	z		m. die	20	<u> </u>	ı	1 8EN	TORITE SEAL 50#	
CASING TYPE.	PVC	SC	REEN T	YPE	PV						_ INST	ALLATION METHOD POURED	\bigcirc
JOINT TYPE	FLISH THREADED										_ FILT	ER PACK OTY 350 SE	
	ITY 12 SACKS	CE>	NTRALIZ	ERS _	<u> 51</u>	EEL	لکے	(C)	<u>د</u>		_ FILT	ER PACK TYPE QUIKRETE ALLPURPOSE SAND	\circ
GROUT TYPE_	75 CAL H20 : 1544	- 084	LLMS M		PE	50	ع =	كشلا	GE	<u> </u>	_ MST	ALLATION METHOD POURED	\bigcirc
CEME	YT Z# QUIK GEL			150		<u> </u>	<u>بلا ،</u>	.0_	=	=			3
ELEY /DEPTH	BOIL /ROCK DESCRIPTION				WEL	_	SKF	TCH	1			INSTALLATION NOTES	10
			1	Τ	<u> </u>		<u> </u>	1					4
£ .		ا الما				.		ــا		لم ر		DEILED 9 HOLE TO 51	
		1410	CKINC	COM	4					of 1	6.5.	SET AND GROUTED 6"	
1272		ėl l		{	1.1	\sqcap	1	1	L	1		SURFACE CASING USING O	
0.0	REFER TO WELL BOS	+		 		++	13	117	76 4		HOLE	SACKS OF CEMENT.	
Ē	FOR STRATIGRAPHY	il 1	1				[3]				RUSH	DRILLED 5" HOLE TO 95"	
<u> </u>	FROM 0.0 TO 49.0 FT.		 	<u> </u>	1	#	1			22	767	CASING, PLACED SAND	
				0.0	<u> </u>	1	F. 1	1	(AP	ED 1	CHICA	ALK 118 TO 50 O.S.	
-	1				1	#	1	714-	#	hea	UZEZ	LETTED SCREEN AND RUMPED	
		E)]	113		1.1	1				AT 2.5 gom FOR APPROX	
	·					1		11 -	\top			I HOUR PLACED BENTONITE	
·		<u> </u>				1		ېال	يځٍ•	н 4		SEAL UP TO 50 5. ALLOWED	
						\mathbf{I}	Π	7 1 Fu	15H '	THE UNIT	ADED	TO HYDRATE OVERNIGHT	
				<u> </u>		<u> </u>		7.1	A51			THEN JETTED AND RUMPED	
							1:1					AS BEFORE PLACED SAND	
_		<u>-</u>				4		واز	X	مرو		PAD TO 48.5 AND GROWIND	
		:			11.	4	1::	1 9	ASI	ان		TO SURFACE USING 6	
				<u> </u>		Ш		<u>il_`</u>		•		SACKS OF CEMENT	
		El l	}					. }		1			
_		1		0.0		11	1.1	<u>:</u>	CEN	IRA	UZER		
		i l						P	200	Kne	,		
-		 			11	1		1-0	ΔŅ	بكد	Ron		
		El l	4	8.5	Ш.	1		1	_		.		
		i 	20	205	47	+			SP	10H	20		
83.8	BECIN SUMPLING AT 535	El l	[11	YA	- a	1.	. [_ [
53.5 60.5	STIFF BLACK SLTY	-		1	H/	H	11	PE	VIO	- 4	~	WELL DEVELOPMENT NOTES	
57.0	STIFF GRAY SILTY	:	59	0	$\sqcup L_{2}$	11	\mathbf{Z}	11			-	PLIMPED 2 HRS AT 6	
-	CLAY SOME FINE	 			+	1+	50	+	+			CAL, MIN. WITH JET PUMP	
	sudo (CL)		ł	1		3		<u></u>		о Я	ker	AFTER COMPLETION	
		E				11		11			- 1		
67.3					1			10	PO	FS	SEEN.		
70.0	GRAY FINE TO MERUM		72.	5			4	Ţi -					
Ĺ	SMO, SOME SILT TO SOME CLAYEY				1	E		-5N	٠٨.	На	E		
	Su-					Ħ	1						
	(SM)	اـــــــــــــــــــــــــــــــــــــ			18	Ħ		-2	PK	یک	200		
•	1	il l	1	-		涯					[·	
-		:	 -	├ ──	+	Į	13	+-	+			1	
				1 :		Ħ		_]	
}	[;}		9.	<u> </u>	4 =					SOTON		
93.0 42.5	HARD GRAY SILTY	El l	92,5	1	16	01		TTP	OF	W	FLL	<u> </u>	
75.0 42.5 95.0	T CLAY TRACE FINE /	;}}		 	+1-	- **		+-	+		 	 	
	South (CH)	[}	}		I	a -		. _	ا لمان			
†	BOTTOM OF HOLE	r †	 	+	+	-		195		_ но		1	
Ĭ.	A1 77.0.	El !	1			- }		1	-		.]	
F		ET	 	 	+-	\dashv		+-				1	
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Golder Associates

JOB NO 8-2-3079 PROJECT SCOHE	BLUFF ROAD /SC WELL	NO
GA INSP. AFG DRILLING METHOD ME	UD KOTSEY GROU	IND ELEV _137.4
WEATHER CLOY DRILLING COMPANY G	EO CONSTRUCTION TESTING COLI	AR ELEV _137.1 DATE (TIME 4/76/85
TEMP. 705 DRILL RIG CME 5	5 DRILLER D. JONES STAR	TED 10:30 3/185 COMPLETED 5 0 3/185
	MATERIALS INVENTORY	
WELL CASING Z" M. dia 96.3	WELL SCREEN Z m. dio 20	LI BENTONITE SEAL 50 H
CASING TYPE PVC	SCREEN TYPE PVC	
JOINT TYPE FLUSH THREADED	SLOT SIZE 0.020	FILTER PACK GTY 280 #
GROUT QUANTITY 10.5 SACKS	CENTRALIZERS	
GROUT TYPE SEE NOTES	DRILLING MUD TYPE 50 # QUICK GEL	- INSTALLATION METHOD POLICED
	:~150 GAL H29	

EV./DEPTH	SOIL / ROCK DESCRIPTION	ı W	ELL	SKE	TCH		INSTALLATION NOTES
		4"LOCKING COVER	<u> </u>		-Top o	F FVC	DRILED 9" HOLE TO 53, SET 6" SURFACE CASING
						ì	AND GROUT USING 3.5
<u> </u>	GROUND SURFACE		-H		2 9 No	M.HOLE	SACKS OF CEMENT
0.0	REFER TO WELL BP3 AND DW-2 FOR	£} } #					DRILLED S"HOLE TO 129.5
	STRATICRAPHY FROM	10.0	+++		1		FT INSTALLED PIC SCREE
	OTO 95.				CELTEA		AND CASING PLACED
		-	1		7"4CH	40 HR61060	LOWER BENTONITE SEAL
					PVCICA	414	FORMATION COLLAPSED
			1-1	<u> </u>	WITH T	EFICH JOINTS	BROW 118.0 FT. INSTALLE
			1	[:::[SAND PACK TO 94. OFT.
			1-1		16 2 m		HERED WELL PROPER TO PLACE
			1:1		H PVC S	THREADEL URFALE	149 ONLER BESTOWITE SCA
			 	-		<u>u </u>	(84 TO 94) THE CLAY AT THE CAS
	-	; 	1:1	$ \cdot $			SEAT SQUEEZED IN CAUSING SC
		<u></u>]. -	-	SURF	ACE IC CEQUI	OF THE BENTONITE TO BRICK
].]				IN THE SURFACE CASINO III
		- 53 5' 	+ 1	<u> </u>)		BENTONITE WAS ROTTED DOWN
			(-			1	INTO PLACE AT THE SAME
		 	+-+				TIME FINES REMOVED FROM
					1		THE SAND PACK DIFING
			-	+++			TIETTING WERE ALSO SETTLE
							BECAUSE THE THICKNES AN
			1	-	HIGH BE	TOUTE	INTEGRITY OF THE BENTON
		F)				.	SEAL WAS SUSPECT, THE
					BENTO	NE SANC	LOW PERMEABILITY LOW
		F)					1, 200
				-	 		PHID LOSS GROUT: 94#
		940			6.		CEMENT: 5" QUICK CIEL
9 5 314	Carrie Carrier	98.5	1	- 7	<u>0 MAD</u>	DACK	ISCAL HOO. PACED
	CLE SALTO CL		E				STEEL COVER
	BROWN FINE TO	08.0	E		COLLEGE	SED_	+
	MEDIUM SOND TRACE						RUMPED SHOURS AT 15gg
	SILT. SP			#	BOTTOM	OF	BEFORE PUMPING PH
	·	1175' 1200'			BENTION	- 1	11.8 AFTER PUMPING PH
<i>-</i>	5 11/11 5 51 51	123.0	777	77,	PELLET	Sin	6.8. AIR LIFTED WITH
, / a.	Y TRACE FINE	128.5		1 000	PVC PU	L MUDE	1-1
8 79 T	SAND OF -		1		COULANTS	نقوا مار ک	SLT.
1.57	BOTTOM OF HOLE			(B	OTTOWN C	SE HOLE	
	167.7				9.5%	1	
		<u> </u>		1			1
				1			
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		El					
				1			L

			the state of the s		
JOB NO 853-3079 PROJECT_SCOHEC / BLUFF RD/SC	WELL NO		0-1	SHEET	1 OF 1
GA INSP_ W.G.G. DRILLING METHOD_ ROTARY	GROUND	ELEV -	138.6	WATER DEP	тн
			140.83		
TEMP 30° TO 55° F DRILL RIG DAVEY DRILLER CHARLIE BURK	STARTED.	10 30 TIME	/12-10-85	COMPLETED	2 00/12-17-85

	MATERIALS INVENTORY	
WELL CASING 6.0 ID. In. dia 17.2 11. CASING TYPE GALVANIZED STEEL JOINT TYPE THREADED	WELL SCREEN 6.0 M. dio. 35.3 II SCREEN TYPE GALVANIZED STEEL	BENTONITE SEAL PELLETS 4.0' INSTALLATION METHOD GRAVITY- HAND POURE OFILTER PACK OTY \$\infty\$ 200 GALS.
GROUT QUANTITY		
GROUT TYPE	DRILLING MUD TYPE JOHNSON REVERT	HAND POURED WHILE FUSHING

ELEV. / DEPTH	SOIL / ROCK DESCRIPTION	WELL SKETCH	INSTALLATION NOTES
		2.2'ABOVE LOCKING STE	SURFACE CASING (CSG)
0.0	GROUND SURFACE	* SUZFACE C	1
0.0	REDDISH BROWN,	APPROX.	
	SOME FINE SAND	SAND GIDGAL	
6.0	NHITE SLIGHTLY MICACEOUS FINE SAND, SOME SILT (SM)	5.5 P	PETARY ORILLED A 10"TO 12" PHOLE
6.0	SAND, SOME DILT (SM)	PELLET	
		11.0' APPROX 10	"-12" FLUSHING . TZIED NUMEROUS TIME
		4.2 TOP OF \$	ESSEUL MIXED JOHNSON REVER
			CLEANED HOLE TO SI.5'. DISTALLED 6" ØGALVANIZED
		OZO" SLOTI CALMANIZI STEEL SC	THE STEEL SCREEN AND RISEZ CSG.
		SSANDPA	DUE TO CRIMP IN 10 18 SURFACE
	NHITE , FINE TO		FLISHING WITH CLEAR MUNICI-
	TRACE SILT (SP)		IBO GALS, OF SAND, INSTALL
		29.4" TOP OF .D	WELL DEVELOPMENT NOTE
		STEEL SCE	CSG WITH SAND, USED
			PUMPED WELL @ *40 GPM FOR
		OSD" SLOT	
		STEEL SE	
			WITH APPROX. 6,500 GALS
			INSTALLED SUBMERSIBLE ROM
		WITH INTAKE @ 47.2' BGS. PUMPED 12,722 GOLS FROM	
			WELL OURING TESTING OF
49.5		A9.5 BOTTOM O	- ALL WATER REMOVED
	CLAY (CL)	51.5 BURLIOLE BURLIOLE	PUMPED INTO SUEFACE
53.0	BOTTOM OF HOLE	53.0 LEBIZIS	- 1

					LLATIO	N LC	OG
JCB NO	PROJECT COURT	100071 1	4D/≤.3		WELL !	ے_ د) - Z SHEET OF !
GA INSP	ES DRILLING METHOD	HOLLOW '	STEM ALG	ER	GROUNG	ELEV _	138.7
WEATHER _=	4.2 DRILLING COMPANY_	TRI- STAT	- =		COLLAF	R ELEV _	142.24 DATE/TIME
TEMP	DE DRILL RIG CME	530	DRILLER	RICK	STARTE	0 10 00 TIME	/12-3-85 COMPLETED (2-30 /2-3-50)
							/ DATE TIME / DATE
			ATERIALS				
WELL CASING	in.dia13.0	LI.f. WELL SC	REEN	in. dia	<u>40 </u>	BENT	ONITE SEAL 100 :
	SCH 40 PVC						LLATION METHOD HAND POURED
	FLUCH THREADED THELDS						
ſ		CENTRALI					R PACK TYPE CHEROKEE FAIR DAND
GROUT TYPE_		- DRILLING	MUD TYPE			_ INSTA	ALLATION METHOD HAND POURLD
ELEV. / DEPTH	SOIL / ROCK DESCRIPTION		WELL	SKET			INSTALLATION NOTES
<u> </u>			-		TEEL COVE	E VE	ALL PVC AND FILTER
-		3.5' 2800€	45	1-2-13	P OF PVC		FABRIC WAS STEAM
Ę		[1		[]	CLEANED PRIOR TO USE.
138.7	GROUND SURFACE	├ │ ━ 		 			
<u>}</u> 0.0					- SEAL		INSTALLED: 40.0' SCREEN
F	ORANGE BROWN	H					13.0° CASILLO
‡	SILTY CLAY	Ė I			-5AND	-	0.5' WELL POINT
Ę.	(CL)	H-		2			AFTER PULING THE
<u> </u>		7.0	[////			[ا بير	COLLAPSED TO 12 C'
- 1307			<i>/////////////////////////////////////</i>	V//////	PEULET S	EAL 3	SUCCEPTED IN 12 C
6.0	PELLON EROTIN	9.0		(1111111)	-mpor si	ZEEN]	PLACED SAND PAINTOSO
Ę	FINE TO MEDIUM			3	المرامة الماسة		PLICED BENTONITE
<u> </u>	SAND, LITTLE JLA/E, SILT	1,2.0		70 70-			SEAL TO 7.0'
-	(5P-5N)		(, · · EEE		i	1	PLACED SAND TO Z.O.
1227		[]				[3	SET PROTECTIVE STEEL
100			" • <u>E</u>		ا بريع ١٩٠٨ / ١		COVER IN CONCRETE
_				• •	, ace no		DEAL.
		FI I	• • = =	• •			
	VELLON-GEAT			10			<u> </u>
	FINE TO SIMILE		1 1 1 1 1 1 1 1 1 1	3			
	SILT (SP-SM)	H ·	• ^ E	3-1-7	-2 PVC SU	į -	
)) ((((((((((((((((((], • ==	3	WITH FILTE	.2	MENTS MADE WITH A
-		H	•	f •]	···-	— J	WEIGHTED TAPE
ļ:				• •		=	
							WELL DEVELOPMENT NOTES
Ē			`. <u>=</u> ==			0	
ŧ			\ . ==		MATERIA	ا ا	WELL NOT DEVELOPED
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<u> </u>		H					
‡		[]					
<u>-</u>		H					
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t							
E		<u> </u>	• • F==	:			
F		<u> </u>	**==	‡≎ ' •]			
250		44.5	· · \(\times \)		-Tip of w	العنظ ا	
55.1	STIFF DURY GRAY	50		9.00	_		
52 b	SILTY CLA/ (CL)	52.6			BOTTOM O		
) · O	BOTTOMOF. WILE					~	

APPENDIX C

Results of Chemical Analysis
of
On-Site Soil Samples

Client:	Golder Asso	clates		ABI Number: 202-265
Project:	Sudhel/Bluf	f Rd. S.C.	(Invoice to)	Client Number: 853-3079
Address:	3772 Pleasa Suite 165 Atlanta, GA	30340	Same	P.O. 85-0118 *************** * For In-House Use * *
Attention	: Mr. A.E. Sta	one, Jr.		*
Sample: _	_water _x_soil	tissue	Sampled by:	Golder (A.E. Stone, Jr.)
Other: _			ABI Manager:	F. Gheesling
******	1/23/85 Recei	ived: 1/30/85	Required: 3/5/85	Completed: 2/26/85
Sample number	Station	Test	required	Results
T 1866	Composite 2	GC/MS FRACTION	N-ACID COMPOUNDS	(ppb)
		2-Chloropheno		<10
		2,4-Dichloroph	nenol	<10
		2,4-Dimethylp		<10
		4,6-Dinitro-0	-cresol	<5
		2,4-Dinitrophe	enol	<50
		2-Nitrophenol		<20
		4-Nitrophenol		<50
		P-chloro-M-cre	esol	<10
		Pentachlorophe	enol	<10
		Phenol		<10
		2,4,6-Trichlor	rophenol	<10

10 00230

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Client:

Golder Associates

ABI Number: 202-265

Project:

Address:

Sudhel/Bluff Rd. S.C.

Suite 165 Atlanta, GA 30340

3772 Pleasantdale Road

(Invoice to) Same

Client Number: 853-3079 P.O. 85-0118

* For In-House Use *

Attention: Mr. A.E. Stone, Jr. Sampled by: Golder (A.E. Stone, Jr.)

Sample: __water x soil __tissue

ABI Manager: F. Cheesling

Other: ___ Sampled: 1/23/85 Received: 1/30/85 Required: 3/5/85 Completed: 2/26/85

Sample number	Station	Test required	Results (ppb)		
T19/7	Composite 3	GC/MS FRACTION-BASE/NEUTRAL COMPOUNDS	/40		
T 1867	Composite	Acenaphthene	<10		
		Acenaphthylene	<10		
		Anthracene	<10		
		Benzidine	<40		
		Benzo (a) anthracene	<10		
		Benzo (a) pyrene	<20		
		3,4-Benzo-fluoranthene	<20		
		Benzo (ghi) perylene	<20		
		Benzo (k) fluoranthene	<20		
		Bis (2-chloroethoxy) methane	<20		
		Bis (2-Chloroethyl) ether	<20		
		Bis (2-(niordechy)) ether	<20		
		Bis (2-Chloroisopropyl) ether	<10		
		Bis (2-Ethyl-hexyl) phthalate			
		4-Bromophenyl phenyl ether	<10		
		Butyl benzyl phthalate	<10		
		2-Chloronaphthalene	<10		
		4 Obligational phenyl ether	<10		
		4-Chlorophenyl phenyl ether	<20		
		Chrysene	<20		
		Dibenzo (a,h) anthracene	<10		
		1,2-Dichlorobenzene	/10		
		1,3-Dichlorobenzene	<10		
		1,4-Dichlorobenzene	<10 (20		
		3,3'-Dichlorobenzidine	<20		
		Diethyl phthalate	<10		
		•	<10		
		Dimethyl phthalate	<10		
		Di-N-Butyl phthalate	<20		
		2,4-Dinitrotoluene	<20		
		2,6-Dinitrotoluene			
		Di-N-Octyl phthalate	<10 (10		
		1,2-Diphenylhydrazine	<20		
		Fluoranthene	<10		
		Fluorene	<10		
		Hexachlorobenzene	<10 <5		
		Hexachlorobutadiene	<5		
		Hexachlorocyclopentadiene	<5		
		Hexachloroethane	<10		
		Indeno (1,2,3-cd) pyrene	<10		
		Isophorone	<10 ·		
		Naphthalene	<10		
		Nitrobenzene	<10		
		a are a said makkal saina	<10		
		N-Nitrosodi-methylamine	<10		
		N-Nitrosodi-N-Propylamine	<10		
		N-Nitro-sodiphenylamine	<10		
		Phenanthrene			
		Pyrene	<10 <10		
		1,2,4-Trichlorobenzene	<10		

				_
Client:	Golder Assoc	ciates		ABI Number: 202-265
Project:	Sudhel/Bluf		(Invoice to)	Client Number: 853-3079 P.O. 85-0118
Address:	3772 Pleasai Suite 165	itdale Road	Same	* For In-House Use
	Atlanta, GA	30340		*
A	n: Mr. A.E. Sto	one Tr		*
Attention	n: mr. n.c. ou ************	+++++++++	************	***
Sample:	water _x_soil	tissue	Sampled by:	Golder (A.E. Stone, Jr.)
Other:			ABI Manager:	F. Cheesling
Sampled:	1/23/85 Rece	Lved: 1/30/85	Required: 3/5/85	Completed: 2/26/85
Sample		7.	** *** ***	Pagulta
number	Station	<u>1 e</u>	st required	Results (ppb)
T 1868	Composite 4	GC/MS FRACT	ION- PESTICIDES	(рри)
		Aldrin		<0.005
		BHC-alpha		<0.005
		BHC-beta		<0.005
		BHC-delta		<0.005
		BHC-gamma		<0.005
		Chlordane		<0.050
		4,4'-DDT		<0.010
		4,4'-DDE		<0.005
		4,4'-000		<0.010
		Dieldrin		<0.005
		Endosulfan-	alpha	<0.005
		Endosulfan-	beta	<0.005
		Endosulfan	sulfate	<0.010
		Endrin		<0.005
		Endrin alde	hyde	<0.010
		Heptachlor	,	<0.005
		Heptachlor	enovide	<0.005
		PCB-1242	epoxide	<0.050
		PCB- 1254		<0.100
		PCB-1221		<0.100
		PCB-1232		<0.100
		PCB-1232		<0.100
		PCB-1240		<0.200
		PCB-1016		<0.050
		Toxaphene		<0.050

Client:	Golder Associates		ABI Number: 202-265
Project:	Sudhel/Bluff Rd. S.	.C. (Invoice to)	Client Number: 853-3079 P.O. 85-0118
Address:	3772 Pleasantdale F Suite 165 Atlanta, GA 30340	Road Same	**************************************
******	Mr. A.E. Stone, Jr	*****	* ************************************
Sample:	water x soiltis	sue Sampled by:	Golder (A.E. Stone, Jr.)
Other:		ABI Manager:	F. Cheesling
Sampled: 1	/23/85 Received: 1	/30/85 Required: 3/5/85	Completed: 2/26/85
Sample	Station	Test required	Results (ppm)
T1869	Composite 5	METALS Antimony Arsenic Beryllium Cadmium	<0.02 0.06 <0.002 <0.001
		Chromium Copper Lead Mercury	7.0 6.4 <0.01 <0.002
		Nickel Selenium Silver Thallium	<0.04 0.13 <0.1 <0.01
		Zinc	0.542
T1870	Composite 6	Cyanide	<0.1
T1871	Composite 7	Phenols	14.1
, , , , ,			

					Page	2 of 19	
Client:	Golder As	ssociates		ABI Number: 202-327			
Project:	Sudhel/Bl	luff Rd. S	.C. (Invoice to)		Client Number: 853-3079.5.4		
Address:	3772 Pied Suite 165	santdale		P.O. 85-0103-0118			
		GA 30340			#	In-House Use #	
Attention	ı: Mr. A.E.	Stone, Jr			*	*	
Sample: _	_water_x_so	il_ tis			A.E. Ston	****************************	
Other:				ABI Manager			
Sample		Sample	Report		Report		
Taken:	1/23/85	Receive	d: 1/30/85 Required:	4/30/85	Issued:	6/7/85	
Sample number	Book/Page Number	Station	Test required		Run 1 Results	Run 2 Results	
			GC/MS VOLATILES		(ppb)	(ppb)	
T 1849		4-3	Benzene		7	4	
	^		Bromoform		<10	<10	
	Boring	27-4	Carbon tetrachloride		<5	<5	
	Sampl	e 3	Chlorobenzene		<5	<5	
	•		Chlorodi-bromomethane		<5	<5	
			Chloroethane		<10	<10	
			2-Chloroethylvinyl ether		<10	<10	
			Chloroform		<5	<5	
			Cis-1,3-dichloropropene		<10	<10	
			Dichlorobromomethane		<5	<5	
			1,1-Dichloroethame		<5	<5	
			1,2-Dichloroethane		<10	<10	
			1,1-Dichloroethylene		<5	<5	
			1,2-Dichloropropane		<10	<10	
			Ethy1benzene		<5	19	
			Methyl bromide		<10	<10	
			Methyl chloride		<10	< 10	
			Methylene chloride		<5	<5	
			1,1,2,2-Tetrachloroethane		<10	<10	
			Tetrachloroethylene		<5	(5	
			Toluene 1,2-Trans-Dichloroethylene		7 <5	23 <5	
			1,1,1-Trichloroethane		<5	<5	
			1,1,2-Trichloroethane		<5	< 5	
			Trans-1,3-dichloropropene		<10	<10	
			Trichloroethylene		<5	45	
			Vinyl chloride		<10	<10	

3 10	0023	34			Page	3_of19
Client:		Associates			ABI Nu	mber: 202-3 <i>2</i> 7
Project:	Project: Sudhel/Bluff Rd. S.C. Address: 3772 Pleasantdale Road Suite 165 Atlanta, GA 30340		(Invoice to)		8	Number: 53-3079.5.4
Address:			Same		P.0. 85-0103-0118 ***********************************	
Attention		. Stone, Jr.		******	*	*
		soiltissue	*************	Sampled by:	A.E. Ston	e, Jr.
Other: _				ABI Manager	: F. Ghee	sling
Sample Taken: 1/	/11/85	Sample Received: 1/16	Report 6/85 Required:	4/30/85	Report Issued:	6/7/85
Sample number	Book/Page Number	Station	Test required		Run 1 Results (ppb)	Run 2 Results (ppb)
T 1850		7-3	GC/MS VOLATILES		(ppo/	(\$\$67
		Borina ST.7	Benzene Bromoform		<5 <10	<5 <10
		Sample 3	Carbon tetrachloride		<5 <5	<5 <5
			Chlorobenzene	•	(5	< 5
			Chlorodi-bromomethan Chloroethane	c	<10	<10
			2-Chloroethylvinyl e	ther	<10	<10
			Chloroform		256	5
			Cis-1,3-dichloroprop	e ne	< 10	<10
			Dichlorobromomethane		<5	<5
			1,1-Dichloroethane		73	<5
			1,2-Dichloroethane		<10	< 10
			1,1-Dichloroethylene		<5	<5
			1,2-Dichloropropane		< 10	<10
			Ethylbenzene		<5	<5
			Methyl bromide		< 10	<10
			Methyl chloride		< 10	< 10
			Methylene chloride		<5	< 5
			1,1,2,2-Tetrachloroe	thane	< 10	<10
			Tetrachloroethylene		<5	<5
			Toluene 1,2-Trans-Dichloroet	hylene	<5 <5	7 <5
			·	•		
			1,1,1-Trichloroethan		658	5
			1,1,2-Trichloroethan		39	<5
			Trans-1,3-dichloropr	opene	< 10	<10
			Trichloroethylene		94	34
			Vinyl chloride		<10	<10

				Page	4 of 19
Client:	Golder	Associates		ABI Nur	mber: 202-327
Project: Sudhel/Bluff Rd. S.C.			(Invoice to)	8:	Number: 53-3079.5.4
Address:	3772 PL Suite 1	easantdale Road 65	Same	****	.0. 85-0103-0118
	Atlanta, GA 30340			*	# #
Attention	n: Mr.A.E	. Stone, Jr.	******	* ********	**********
Sample: _	water x	soiltissue	Sampled (by: A.E. Stone	e, Jr.
Other: _			ABI Manag	ger: F. Ghee:	sling
Sample Taken: 1	1/11/85	Sample Received: 1/10	Report 6/85 Required: 4/30/85	Report Issued: (5/7/85
Sample number	Book/Page Number	Station	Test required	Run 1 Results	Run 2 Results
T 1851		7-7	GC/MS VOLATILES	(ppb)	(ppb)
		Boring ST-	Benzene Bromoform	14 <10	<5 <10
		Sample 7	Carbon tetrachloride Chlorobenzene	<5 <5	<5 <5
			Chlorodi-bromomethane Chloroethane	<5 <10	<5 <10
			2-Chloroethylvinyl ether Chloroform	< 10 < 5	<10 <5
			Cis-1,3-dichloropropene Dichlorobromomethane	₹10 <5	< 10 < 5
			1,1-Dichloroethane 1,2-Dichloroethane	<5 <10	<5 <10
			1,1-Dichloroethylene 1,2-Dichloropropane	<5 <10	<5 <10
			Ethylbenzene Methyl bromide	<5 <10	<5 <10
			Methyl chloride Methylene chloride	<10 <5	<10 9
			1,1,2,2-Tetrachloroethane Tetrachloroethylene	<10 <5	<10 <5
			Toluene 1,2-Trans-Dichloroethylene	11 <5	4 <5
			1,1,1-Trichloroethane 1,1,2-Trichloroethane	22 <5	7 <5
			Trans-1,3-dichloropropene Trichloroethylene	<10 <5	<10 <5
			Vinyl chloride	<10	<10

Page __5_of_19 Golder Associates Client: ABI Number: 202-327 Sudhel/Bluff Rd. S.C. Project: Client Number: 853-3079.5.4 P.O. No. 85-0103-0118 (Invoice to) 3772 Pleasantdale Road Address: Same Suite 165 * For In-House Use Atlanta, GA 30340 Attention: Mr. A.E. Stone, Jr. Sample: __water x soil tissue Sampled by: A.E. Stone, Jr. Other: ABI Manager: F. Gheesling Sample Sample Report Report Required: 4/30/85 Taken: 1/11/85 Received: 1/16/85 Issued: 6/7/85 Sample Book/Page Run 1 Run 2 Results number Number Results Station Test required (ppb) (ppb) T1852 8-5 GC/MS VOLATILES Benzene <5 **<5** Bromoform <10 < 10 Borns ST-8 Carbon tetrachioride <5 ۲> Sample 5 Chlorobenzene **<**5 <5 Chlorodi-bromomethane <5 <5 Chloroethane <10 < 10 2-Chloroethylvinyl ether < 10 <10 Chloroform 376 22 Cis-1,3-dichloropropene <10 <10 Dichlorobromomethane **<**5 <5 1.1-Dichloroethane <5 <5 1,2-Dichloroethane <10 < 10 1,1-Dichloroethylene <5 < 5 <10 1,2-Dichloropropane < 10 <5 Ethylbenzene <5 Methyl bromide <10 < 10 Methyl chloride < 10 < 10 Methylene chloride **<**5 <5 1,1,2,2-Tetrachloroethane < 10 <10 Tetrachloroethylene 131 4 Toluene 18 1,2-Trans-Dichloroethylene <5 <5 1,1,1-Trichloroethane 11 56 1,1,2-Trichloroethane Trans-1,3-dichloropropene **<**5 <5 <10 < 10 Trichloroethylene <5 <5

Vinyl chloride

< 10

< 10

				Page	<u>6</u> of 19
Client:	Golder A	ssociates		ABI Num	ber: 202-327
Project: Sudhel/Bluff Rd. S.C. Address: 3772 Pleasantdale Road Suite 165 Atlanta, GA 30340		Sluff Rd. S.C.	(Invoice to)		Number: 179.5.4
		55	Same	*****	lo. 85-0103-0118 ***********************************
				*	
Attention:	Mr. A.E.	Stone, Jr.	**	* **********	*********
Sample:	water <u>x</u> s	oiltissue	Sampled by	y: A.E. Sto	ne, Jr.
Other:			ABI Manager: F. Cheesling		ling
Sample Taken: 1/1	1/85	Sample Received: 1/16	Report 8/85 Required: 4/30/85	Report Issued: 6	77/85
Canala D.	********** . ok /D . = o	**********	·**************	Run 1	Run 2
	ook/Page umber	Station	Test required	Results	Results
Trainber 11	J.IIID C I	<u>Station</u>	- Todalica	(ppb)	(ppb)
T 1853		9-1	GC/MS VOLATILES		• •
			Benzene	29	12
			Bromoform	<10	< 10
		PARIOS ST-9			
		Comp ST-9 Sample 1	Carbon tetrachloride	<5	<5
		sample i		132	16
			Chlorodi-bromomethane	< 5	< 5
			Chloroethane	<10	< 10
			2-Chloroethylvinyl ether	<10	<10
			Chloroform	51	<5
			Cis-1,3-dichloropropene	<10	< 10
			Dichlorobromomethane	<5	<5
			1,1-Dichloroethane	<5	<5
			1,2-Dichloroethane	₹10	<10
			1,1-Dichloroethylene	<5	<5
			1,2-Dichloropropane	<10	<10
			Ethylbenzene	489	91
			Methyl bromide	<10	<10
			Methyl chloride	<10	<10
			Methylene chloride	<5	<5
			1,1,2,2-Tetrachioroethane	<10	<10
			Tetrachloroethylene	23465	1361
			Toluene	345	65
			1,2-Trans-Dichloroethylene	<5	<5
			1,1,1-Trichloroethane	1688	87
			1,1,2-Trichloroethane	< 5	(5
	*		Trans-1,3-dichloropropene	<10	<10
			Trichloroethylene	86	<5
			Vinyl chloride	<10	<10

					Page _	7 of 19
Client:	Golder A	Associates			ABI Nu	mber: 202-3 <i>2</i> 7
Project:	Sudhel/E	Bluff Rd. S.C.	(Invoice to)		Client Number: 853-3079.5.4	
Address:	3772 Ple Suite 16	easantdale Road	Same		*****	No. 85-0103-0118 ***********************************
	Atlanta,	, GA 30340			*	:
Attention	: Mr. A.E.	Stone, Jr.	*********	*****	*	***********
Sample: _	water x s	soiltissue	Samp	oled by:	A.E. St	cone, Jr.
Other: _			ABI	Manager	: F. Ghee	esling
Sample		Sample	Report		Report	
Taken: 1	/11/85	Received: 1/16	6/85 Required: 4/30/		Issued:	
		********	********	******	**************************************	Run 2
Sample number	Book/Page Number	Station	Test required		Results (ppb)	Results (ppb)
T1854		9-3	GC/MS VOLATILES		(ppb)	(550)
			Benzene		56	9
			Bromoform		<10	<10
		Ver -2 (=			1.0	
		Sould 2	Carbon tetrachloride Chlorobenzene		<5	<5
		sample s	Chlorobenzene		<5	<5
			Chlorodi-bromomethane		<5	<5
			Chloroethane		<10	<10
			2-Chloroethylvinyl ether		<10	<10
			Chloroform		<5	<5
			Cis-1,3-dichloropropene		<10	<10
			Dichlorobromomethane		<5	(5
			1,1-Dichloroethane		(5	<5
			1,2-Dichloroethane		<10	<10
			1,1-Dichloroethylene		<5	<5
			1,2-Dichloropropane		<10	<10
			Ethylbenzene		(5	11
			Methyl bromide		<10	<10
			Methyl chloride		<10	<10
			Methylene chloride		94	<5
			1,1,2,2-Tetrachloroethane		<10	<10
			Tetrachloroethylene		35	35
			Toluene		37	25
			1,2-Trans-Dichloroethylene	9	<5	<5
			1,1,1-Trichloroethane		<5	<5
			1,1,2-Trichloroethane		<5	<5
			Trans-1,3-dichloropropene		<10	<10
			Trichloroethylene		<5	<5
			Vinyl chloride		<10	<10

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Client Golder Associates								
Sudhel/Bluff Rd. S.C.		Colder As	sociates				ABI Numb	er: 202-327
Project: Sudhel/Bluff Rd. S.C. (Invoice to) 833-3079.578 879-3079.578 779. No. 35-0103-0118 789. No. 35-0103-011	Client:	COTGET VA	,30014000				Client N	umber:
Address: 3772 Pleasantdale Road Same For In-House Use Suite 163 Atlanta, GA 30340 Sample Mind Atlanta, GA 30340 Sample Mind Atlanta, GA 30340 Sample Mind Atlanta, GA 30340 Sample Mind Atlanta, GA 30340 Sample Mind Atlanta, GA 30340 Sample Alexanta	Project:	Sudhel/Bl	Luff Rd. S.C.	(Invoice to	,)		853-307 P.O. No	9.5.4 . 85-0103-0118
Address: 377 Pleasantal Notation Suite 163 Atlantal, GA 30340				C				
Suite 165	A al dispers	3772 Plea	asantdale Road	Same			* For I	n-House Use Ţ
Attention: Mr. A.E. Stone, Jr. Sample:water x soil _ tissue	Addi ess.	Suite 16	5				*	Ī
No. No.		Arlanta.	GA 30340				*	<u> </u>
Sample		Metawest	<u> </u>				*	*
Sample Taken: 1/11/85 Sample Received: 1/16/85 Required: 4/30/85 Resport Issued: 6/7/85 Required: 4/30/85 Resport Issued: 6/7/85 Required: 4/30/85 Results Resul		*****	*****	***	**************************************	****** ed by:	A.E. Sto	ne, Jr.
Sample	Sample: _	_water _x_s	oiltissue		ABI)	Manager:	F. Ghees	ling
Sample 1/11/85 Sample Required: 4/30/85 Issued: 6/7/85	Other:						Popont	
1/11/85 Required: 4/30/85 Issued: 5/84 Issu	-		21000	Report		0 F		17/85
Sample	Sample		Sample		ed: 4/30/0	85	155060:	****
Sample Number Station Test required Results Results Republic Results Republic Results Republic Results Republic Republic Results Republic Republic Republic Results Republic Repub		1/11/85	Received: 1/1		****	*****	**************************************	D 2
Sample Number N			****					nun Z
Number Station Stati	Campie	Book/Page		Tast reguli	red		Results	
Timber T			Station	Test requir			(ppb)	(bba)
Benzene 21 65	number	Manber		WE NO ATTIES				
Benzene Carbon tetrachloride Cs Cs Cs Chlorobenzene Cs Cs Cs Cs Cs Cs Cs C	71466		10-1	GC/MS VOLATILLS				**
Second State Sta	(1822						21	
Carbon tetrachloride								<10
Carbon tetrachloride Chiorobenzene Chiorodi-bromomethane Chioroethane 2-Chioroethylvinyl ether Chioroform Cis-1,3-dichloropropene Dichlorobromomethane 1,1-Dichloroethane 1,1-Dichloroethane Chioropropane Ethylbenzene Methyl bromide Methyl chloride Methylene chloride 1,1,2,2-Tetrachloroethane Tetrachloroethylene Chioropropane 1,1,2-Trais-Dichloroethylene Chioropropane 1,1,2-Traichloroethylene Chioropropane Chioroprop				Bromoform			***	
Chlorodenzene Chlorodethane Chloroethane 2-Chloroethylvinyl ether Chloroform Cis-1,3-dichloropropene Dichloroethane 1,1-Dichloroethane 1,2-Dichloroethylene 1,2-Dichloropropane Ethylbenzene Methyl bromide Methyl chloride Methyl chloride Methylene chloride 1,1,2-Trans-Dichloroethylene 1,1,1-Trichloroethylene 1,1,1-Trichloroethylene 1,1,1-Trichloroethylene 1,1,1-Trichloroethylene 1,1,1-Trichloroethylene 1,1,1-Trichloroethylene 1,1,1-Trichloroethylene 1,1,1-Trichloroethane 1,1,2-Trichloroethane 1,2,2-Trichloroethane 1,2,2-Trichloroethane 1,2,2-Trichloroethane 1,2,2-Trichloroethane 1,2,2-Trichloroethane 1,2,2-Trichloroethane 1,2,2-			< -	., "			C 5	<5
Chlorobenzene Chlorodi-bromomethane Chlorodi-bromomethane Chloroethane 2-Chloroethylvinyl ether Clis-1,3-dichloropropene Cis-1,3-dichloropropene Dichlorobromomethane 1,1-Dichloroethane Cis-1,1-Dichloroethane Cis-1,1-Dichloroethane Cis-1,1-Dichloroethane Cis-1,1-Dichloroethane Cis-1,1-Dichloroethylene Cis-1,1-Dichloroethylene Cis-1,1-Dichloroethylene Cis-1,1-Dichloroethylene Cis-1,1-Dichloroethylene Cis-1,1-Dichloroethylene Cis-1,1-Dichloroethylene Cis-1,1-Dichloroethylene Cis-1,1-Dichloroethylene Cis-1,1-Dichloroethane Cis-1,1-Dichloroethane Cis-1,1-Dichloroethylene Cis-1,1-Cis-Inchloroethane Cis-1,1-Cis-Inchloroethane Cis-1,1-Trichloroethane Cis-1,1-Trichloroethane Cis-1,1-Trichloroethane Cis-1,1-Trichloroethane Cis-1,1-Cis-Inchloroethan			Comment - In	Carbon tetrachl	oride			<5
Chloroethane 2-Chloroethylvinyl ether Chloroform Cis-1,3-dichloropropene Dichlorobromomethane 1,1-Dichloroethane 1,2-Dichloroethylene 1,2-Dichloropropene 1,2-Dichloropropene 1,2-Dichloropropene 1,2-Dichloropropene 1,2-Dichloropropene 1,2-Dichloropropene 1,2-Dichloropropene 1,2-Dichloropropene 1,2-Dichloropropene 1,2-Tetrachloroethane 1,1,2,2-Tetrachloroethane 1,1,2,2-Tetrachloroethane 1,1,1-Trichloroethylene 1,2-Trans-Dichloropethane 1,1,1-Trichloroethane			ا ع ر ج ج	Chiarabenzene				<5
Chloroethane				Chlorodi-bromom	ethane			•
2-Chloroethylvinyl ether Chloroform Cis-1,3-dichloropropene Cis-1,3-dichloropropene Dichlorobromomethane 1,1-Dichloroethane 1,2-Dichloroethane 1,2-Dichloroethylene 1,2-Dichloropropane Ethylbenzene Methyl bromide Methyl chloride Methyl chloride Methylene chloride 1,1,2,2-Tetrachloroethane 1,2-Trans-Dichloroethylene 1,1,1-Trichloroethylene 1,1,1-Trichloroethane 1,2-Trans-Dichloroethane 1,1,1-Trichloroethane 1,1,1-				Chloroethane			< 10	(10
2-Chloroethylvinyl ether Chloroform Clis-1,3-dichloropropene Dichlorobromomethane 1,1-Dichloroethane 1,2-Dichloroethylene 1,2-Dichloropropane Ethylbenzene Methyl bromide Methyl chloride Methyl chloride Methylene chloride 1,1,2-Tetrachloroethane 1,2-Trans-Dichloroethylene 1,1,2-Trans-Dichloroethylene 1,1,2-Trans-Dichloroethane 1,1,1-Trichloroethane				CHIOLOGOME				(10)
Chloroform Cis-1,3-dichloropropene Cis-1,3-dichloropropene Dichlorobromomethane 1,1-Dichloroethane Ci0 Cis-1,2-Dichloroethane Ci0 Cis-1,2-Dichloroethane Ci0 Cis-1,3-dichloropropene Ci0 Cis-1,3-dichloropropene Ci0 Ci0 Ci0 Ci0 Ci0 Ci0 Ci0 Ci0 Ci0 Ci0				a Chlomosthylyi	invl ether			
Cis-1,3-dichloroproperle Dichlorobromomethane 1,1-Dichloroethane 1,2-Dichloroethane 1,1-Dichloroethane 1,2-Dichloropropane Ethylbenzene Methyl bromide Methyl chloride Methyl chloride Methyl chloride Methylene chloride 1,1,2,2-Tetrachloroethane Toluene 1,2-Trans-Dichloroethylene 1,1,1-Trichloroethylene 1,1,1-Trichloroethane T,1,1-Trichloroethane e				2=Chiordechy 1 v	, 2 00			
Dichlorobromomethane				CUIOLOLOLU	ronroneue		< 10	
1,1-Dichloroethane				C15-1, 3-0101101	optopene		<5	< 5
1,1-Dichloroethane 1,2-Dichloroethane 1,2-Dichloroethylene 1,1-Dichloropthylene 1,2-Dichloropropane Ethylbenzene				Dichlorobromom	Ethane			
1,2-Dichloroethane 1,1-Dichloroethylene 1,2-Dichloropropane Stylbenzene							<5	<5
1,1-Dichloroethylene 1,2-Dichloropropane Ethylbenzene Methyl bromide Methyl chloride Methyl chloride Methylene chloride 1,1,2,2-Tetrachloroethane Tetrachloroethylene 1,2-Trans-Dichloroethylene 1,2-Trans-Dichloroethane 1,1,1-Trichloroethane				1,1-Dichloroet	nane		<10	<10
1,1-Dichloroethylene				1,2-Dichloroet	nane		<5	<5
1,2-Dichloropropane 379 48				1.1-Dichloroet	hy Lene			: 10
Ethylbenzene				1.2-Dichloropr	opane		110	
Ethylbenzene Methyl bromide Methyl chloride Methyl chloride Methylene chloride 1,1,2,2-Tetrachloroethane Tetrachloroethylene Toluene 1,2-Trans-Dichloroethylene 1,1,1-Trichloroethane 1,1,1-Trichloroethane 1,1,2-Trichloroethane Trans-1,3-dichloropropene Trichloroethylene (10				·			379	48
Methyl bromide <10				Ethylbenzene				<10
Methyl chloride 24 19 Methylene chloride 24 19 I,1,2,2-Tetrachloroethane 200 5 Tetrachloroethylene 1080 29 Foluene 5 5 1,2-Trans-Dichloroethylene 5 5 1,1,1-Trichloroethane 5 5 1,1,2-Trichloroethane 5 5 1,1,2-Trichloroethane 5 5 1,1,2-Trichloroethane 5 5 1,1,2-Trichloroethylene 5 5				Methyl bromide	•			
Methylene chloride				Mathyl chloric	le			
1,1,2,2-Tetrachloroethane				Methylene chi	ride		24	,,
1,1,2,2-Tetrachloroethane 200 65 Tetrachloroethylene 1080 29 Toluene 5 5 1,2-Trans-Dichloroethylene 8 7 1,1,1-Trichloroethane 5 65 1,1,2-Trichloroethane 5 65 1,1,2-Trichloroethane 5 65 Trichloroethylene 6 6 6 Trans-1,3-dichloropropene 6 6 Trichloroethylene 6 6 6 Trichloroethylene 6 6 6 Trichloroethylene 6 6 Trichloroethylene 6 6 Trichloroethylene 6 6 Trichloroethylene 6 6 Trichloroethylene 6 6 Trichloroethylene 6 6 Trichloroethylene 6 6 Trichloroethylene 6 6 Trichloroethylene 6 6 Trichloroethylene 6 6 Trichloroethylene 6 6 Trichloroethylene 6 Trichloroethylene 6 Trichloroethylene 6 Trichloroethylene 6 Trichloroethylene 6 Trichloroethylene 6 Trichloroethylene 6 Trichloroethylene 6 Trichloroethylene 6 Trichloroethylene 6 Trichloroethylene 6 Trichloroethylene 6 Trichloroethylene 6 Trichloroethylene 6 Trichloroethylene 7 Trichlo				He city Tette 5.15.				Z10
Tetrachloroethylene				1 1 1 3 Tetra	hloroethan	e		
Toluene 1,2-Trans-Dichloroethylene 1,1,1-Trichloroethane 3,1,2-Trichloroethane 4,1,2-Trichloroethane 5,5 5,1,2-Trichloropene 7,3-dichloropropene 7,3-dichloroethylene 7,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0				[, [, 2, 2-16 t] at	ny lene			
1,2-Trans-Dichloroethylene 1,1,1-Trichloroethane					ily Ichic		1080	
1,1,1-Trichloroethane				lotneue	hloroethule	ne	<5	(5
1,1,1-Trichloroethane				1,2-[rans-Dic	HTOLOG CHÀ TC			_
1,1,1-Trichloroethane							8	
1,1,2-Trichloroethane				1,1,1-Trichlo	roethane		رة.	
Trans-1,3-dichloropropene (5 (5) Trichloroethylene				1 1) Trichlo	rnethane	_		<10
Trichloroethylene (10)				Trans-1.3-dic	niocobcobe	ie		<5
\sim 10				Trichloroethy	lene		\ J	••
Vinyl chloride		1					/10	₹10
VIIIVI GUADELLE				Vinvi chiorio	ie		< 1U	* 10
				ATHAT CHIOLIC				

					rage		
Client:	Golder	Associates			ABI N	umber: 202-3 <i>2</i> 7	
Address: 3772 Pleas Suite 165		Bluff Rd. S.C.	(Invoice to)	Invoice to)		Client Number: 853-3079.5.4	
		easantdale Road 65 , GA 30340	Same		P.0. No. 85-0103-0118 ********* * For In-House Use * *		
Attention:		Stone, Jr.	*********	****	*	*	
		soiltissue		mpled by:		tone, Jr.	
Other: _			AB	l Manager	: F. Ghe	esling	
	/11/85	Sample Received: 1/10	Report 6/85 Required: 4/3		Report Issued:		
Sample number	Book/Page Number	Station	Test required		Run 1 Results	Run 2 Results	
T 1856		11-3	GC/MS VOLATILES		(ppb)	(ppb)	
		Bor with	Benzene Bromoform		<5 <10	<5 <10	
			Carbon tetrachloride		<5	<5	
			Chlorobenzene		<5	<5	
			Chlorodi-bromomethane		<5	<5	
			Chloroethane		<10	<10	
			2-Chloroethylvinyl ether		<10	<10	
			Chloroform		<5	<5	
			Cis-1,3-dichloropropene Dichlorobromomethane		<10 <5	<10 <5	
			1,1-Dichloroethane		<5	<5	
			1,2-Dichloroethane		<10	<10 <5	
			1,1-Dichloroethylene		<5 <10	<10	
			1,2-Dichloropropane				
			Ethylbenzene		<5	< 5	
			Methyl bromide		<10	<10	
			Methyl chloride		<10	<10	
			Methylene chloride		<5	<5	
			1,1,2,2-Tetrachloroethan	e	<10	<10	
			Tetrachloroethylene		<5	<5	
			Toluene		11	25	
			1,2-Trans-Dichloroethyle	ne	<5	<5	
			1,1,1~Trichloroethane		<5	<5	
			1,1,2-Trichloroethane		<5	<5	
			Trans-1,3-dichloropropen	e	<10	<10	
			Trichloroethylene		<5	<5	
			Vinyl chloride		<10	<10	

014	Coldo-	Associates		_	10 of 19
Client:	Gorder	ASSOCIATES		ABI Nu	mber: 202-327
Project:	Sudhel/	Bluff Rd. S.C.	(Invoice to)	853-3	Number: 079.5.4 No. 85-0103-0118
Address:	Suite 1	easantdale Road 65 , GA 30340	Same	*****	In-House Use *
Attention	n: Mr. A.E	. Stone, Jr.		*	*
Sample:	water_x	soiltissue	Sampled	by: A.E. St	one, Jr.
Other:			ABI Mar	nager: F. Ghee	sling
Sample Taken:	1/11/85	Sample Received: 1/1	Report 5/85 Required: 4/30/85	Report Issued:	6/7/85
Sample number	Book/Page Number	Station	Test required	Run 1 Results (ppb)	Run 2 Results (ppb)
T 1857		12-1	GC/MS VOLATILES	(ppb)	(ppu)
		_	Benzene Bromoform	82 <10	<10
		Corney ST-13 Elimple 1	Carbon tetrachloride Chlorobenzene Chlorodi-bromomethane	<5 168 <5	<5 32 <5
			Chloroethane	<10	< 10
			2-Chloroethylvinyl ether Chloroform Cis-1,3-dichloropropene Dichlorobromomethane	<10 <5 <10 <5	<10 <5 <10 <5
			1,1-Dichloroethane 1,2-Dichloroethane 1,1-Dichloroethylene 1,2-Dichloropropane	<5 <10 <5 <10	<5 <10 <5 <10
			Ethylbenzene Methyl bromide Methyl chloride Methylene chloride	<5 <10 <10 110	<5 <10 <10 5
			1,1,2,2-Tetrachloroethane Tetrachloroethylene Toluene 1,2-Trans-Dichloroethylene	<10 231 106 <5	15 <5 8 <5
			1,1,1-Trichloroethane 1,1,2-Trichloroethane Trans-1,3-dichloropropene Trichloroethylene	30 <5 <10 115	5 <5 <10 6
			Vinyl chloride	<10	<10

					Page	11 of 19
Client: Golder Associates					ABI N	umber: 202-327
Project: Sudhel/Bluff Rd. S.C. Address: 3772 Pleasantdale Road Suite 165 Atlanta, GA 30340				Clien	t Number:	
			(Invoice to)		853-	3079.5.4
		Same		P.O. No. 85-0103-0118 ******** * For In-House Use * *		
Attentio	n: Mr. A.E	. Stone. Jr.			*	*
****	*****	*****	***			
Sambie:	water x	soiltissue		Sampled by:	A.E. S	itone, Jr.
Other:				ABI Manager:	F. Ghe	esling
Sample Taken:	1/11/85	Sample Received: 1/16	Report 5/85 Required:	4/30/85	Report Issued:	6/7/85
Sample	Book/Page	* * * * * * * * * * * * * * * * * * * *	*****		Run 1	Run 2
number	Number	Station	Test required		Results	Results
T 1858		12-4	GC/MS VOLATILES		(ppb)	(ppb)
			Benzene		21	9
		Corbo ST-10	Bromoform		<10	<10
			Carbon tetrachloride	e	<5	<5
		Emorph 4	Chlorobenzene		<5	<5
			Chlorodi-bromomethan	ne	<5	<5
			Chloroethane		<10	<10
			2-Chloroethylvinyl	ether	< 10	<10
			Chloroform		44	32
			Cis-1,3-dichloroprop	pene	< 10	< 10
			Dichlorobromomethan		<5	<5
			1,1-Dichloroethane		<5	<5
			1,2-Dichloroethane		<10	₹10
			1,1-Dichloroethylene	ρ	35	35
			1,2-Dichloropropane	-	<10	<10
			Ethylbenzene		<5	(5
			Methyl bromide		<10	<10
			Methyl chloride		<10	<10
			Methylene chloride		< 5	ζ5
			1 1 2 2 Totmachlana		<10	<10
			1,1,2,2-Tetrachloroe Tetrachloroethylene	ethane	114	29
			Toluene		12	16
			1,2-Trans-Dichloroe	thylene	<5	<5
			1,1,1-Trichloroetha	ne	<5	<5
			1,1,2-Trichloroetha		< 5	(5
			Trans-1,3-dichlorop		₹10	<10
			Trichloroethylene	· opene	21	7
			Vinyl chloride		<10	< 10

				Page	12 of 19
Client:	Golder	Associates		ABI Nur	mber: 202-327
Project: Sudhei/Bluff Rd. S.C.		Bluff Rd. S.C.	(Invoice to)	853-30	Number: 079.5.4 No. 85-0103-0118
Address:	Suite 1	easantdale Road 65 , GA 30340	Same	****** * For *	In-House Use *
Attention	n: Mr. A.E	. Stone, Jr.		* * ********	* *
Sample: _	water <u>x</u>	soiltissue	Sampled by		
Other: _		 	ABI Manage	er: F. Ghee:	sling
	1/11/85	Sample Received: 1/16	Report 5/85 Required: 4/30/85	Report Issued: (
Sample number	Book/Page Number	<u>Station</u>	Test required	Run 1 Results (ppb)	Run 2 Results
T 1859		12-A	GC/MS VOLATILES	(ppo)	(ppb)
		Berna ST-13	Benzene Bromoform	352 <10	101 <10
		Barrie A	Carbon tetrachloride Chlorobenzene	<5 <5	<5 <5
			Chlorodi-bromomethane	<5	<5
			Chioroethane	<10	<10
			2-Chloroethylvinyl ether Chloroform	<10 8	<10 4
			Cis-1,3-dichloropropene	<10	<10
			Dichlorobromomethane	<5	<5
			1,1-Dichloroethane	<5	<5
			1,2-Dichloroethane	<10	< 10
			1,1-Dichloroethylene 1,2-Dichloropropane	<5 <10	<5 <10
			Ethylbenzene	<5	< 5
			Methyl bromide	<10	₹10
			Methyl chloride	<10	< 10
			Methylene chloride	24	7
			1,1,2,2-Tetrachloroethane Tetrachloroethylene	<10 <5	1 <5
			Toluene	ั้ย	`5
•			1,2-Trans-Dichloroethylene	<5	<5
			1,1,1-Trichloroethane	38	7
			1,1,2-Trichloroethane	<5	<5
			Trans-1,3-dichloropropene	< 10	<10
			Trichloroethylene	<5	<5
			Vinyl chloride	< 10	<10

				Page _	13 of 19		
Client:	Golder	Associates		ABI Nur	mber: 202-327		
Project:	Sudhel/	Bluff Rd. S.C.	(Invoice to)	853-30	Client Number: 853-3079.5.4		
Address:	3772 P1 Suite 1	easantdale Road	Same	*****	P.0. No. 85-0103-0118 ***********************************		
		, GA 30340		*	*		
Attention	n: Mr. A.E	. Stone, Jr.	***************	*	*******		
Sample: _	water_x	soiltissue	Sampled by	y: A.E. Sto	one, Jr.		
Other: _		<u> </u>	ABI Manage	er: F. Ghee	sling		
Sample Taken:	1/11/85	Sample Received: 1/16		Report Issued:	6/7/85		
Sample	Book/Page Number	Station	Test required	Run 1 Results	Run 2 Results (ppb)		
T 1860		14-1	GC/MS VOLATILES	(ppb)	(рро)		
			Benzene Bromoform	12	<5 <10		
		Econo ST-14		<5	<5		
		Carry 1-1	Chlorobenzene	< 5	<5		
			Chlorodi-bromomethane	<5	(5		
			Chloroethane	<10	<10		
			2-Chloroethylvinyl ether	<10	<10		
			Chloroform	<5	<5 <10		
			Cis-1,3-dichloropropene Dichlorobromomethane	<10 <5	<5		
			1,1-Dichloroethane	(5	<5		
			1,2-Dichloroethane	<10	<10		
			1,1-Dichloroethylene 1,2-Dichloropropane	<5 <10	<5 <10		
			Ethylbenzene	<5	<5		
			Methyl bromide	<10	<10		
			Methyl chloride Methylene chloride	<10 41	<10 9		
			1,1,2,2-Tetrachloroethane	<10	<10		
			Tetrachloroethylene	<5	<5		
			Toluene	14	6		
			1,2-Trans-Dichloroethylene	<5	<5		
			1,1,1-Trichloroethane	14	19		
			1,1,2-Trichloroethane	(5	<5		
			Trans-1,3-dichloropropene	<10	<10		
			Trichloroethylene	<5	<5		
			Vinyl chloride	<10	<10		

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Client:	Golder	Associates					umber: 202-327
Project:	Sudhel/	Bluff Rd. S.C.	(In	voice to)		Client Number: 853-3079.5.4	
	2772 01					P.O.	No. 85-0103-0118
Address:	Suite 1	easantdale Road		Same			**********
		, GA 30340				* 101	In-House Use *
						*	
		. Stone, Jr.				*	*
**************************************		soiltissue	*******	**************************************	ampled by:	A.F. St	**************************************
	772 1						
Other:				^4	BI Manager:	F. Ghee	esling
Sample Taken: 1/1	11/85	Sample Received: 1/10		Report Required: 4/3	30/85	Report Issued:	6/7/85
		******	*******	*******	********	*******	******
Account to the second s	Book/Page Number	Station	Test	required		Run 1 Results (ppb)	Run 2 Results (ppb)
T1861		17-1	GC/MS VOL	ATILES			
			Benzene			2035	8250
			Bromoform			<10	<10
		B No	01 01101 01111				
		Borne ST. T		trachloride		<5	<5
		Trucks 1	Chloroben			39	43
				bromomethane		<5	<5
			Chloroeth	ane		<10	<10
			2-Chloroe	thylvinyl ether		<10	<10
			Chlorofor			<5	<5
				ichloropropene		<10	<10
				romomethane		<5	(5
						14.24	
				oroethane		<5	(5
			1,2-Dichl			<10	<10
				oroethylene		(5	(5)
			1,2-01011	oropropane		<10	<10
			Ethylbenz	ene		<5	<5
			Methyl br			<10	<10
			Methyl ch			<10	<10
			Methylene			1250	4292
			1 1 2 2-1	etrachloroethan	ne	<10	<10
			Tetrachlo	roethylene		(5	(5
			Toluene			125	648
				-Dichloroethyle	ene	<5	<5
			1 1 1-Tei	chloroethane		<5	<5
				chloroethane		(5	(5
				-dichloroproper	ne	<10	<10
			Trichloro			<5	<5
			Vinyl chl	oride		<10	<10

				Page 1	of 19
Client:	Golder	Associates		ABI Numbe	er: 202-327
Project:	ect: Sudhel/Bluff Rd. S.C.		(Invoice to)	Client Number: 853-3079.5.4 P.O. No. 85-0103-0118 ***********************************	
Address: 3772 Plea Suite 165		easantdale Road	Same		
	Atlanta	, GA 30340		*	:
Attention	: Mr. A.E	. Stone, Jr.	*************	*	*
		soiltissue	Sampled by:	A.E. Stone	
Other: _			ABI Manager:	F. Gheesli	ing
Sample Taken: 1	1/11/85	Sample Received: 1/16	Report 5/85 Required: 4/30/85	Report Issued: 6/2	7/85
Sample number	Book/Page Number	Station	Test required	Run 1 Results (ppb)	Run 2 Results (ppb)
T1862		17-2	GC/MS VOLATILES	(ррь)	(ppb)
			Benzene Bromoform	<5 <10	<5 <10
		Ear no ET-17 Sample a	Carbon tetrachloride	<5	<5
		Dairpie on	Chlorobenzene	<5	<5
			Chlorodi-bromomethane	<5	<5
			Chloroethane	<10	<10
			2-Chloroethylvinyl ether	<10	<10
			Chloroform	47	10
			Cis-1,3-dichloropropene Dichlorobromomethane	<10 <5	<10 <5
			1,1-Dichloroethane	(5	<5
			1,2-Dichloroethane	<10	<10
			1,1-Dichloroethylene	<5	<5
			1,2-Dichloropropane	<10	<10
			Ethylbenzene	<5	<5
			Methyl bromide	<10	<10
			Methyl chloride	<10	<10
			Methylene chloride	<5	<5
			1,1,2,2-Tetrachloroethane	<10	<10
			Tetrachloroethylene	(5	(5
			Toluene	<5	<5
			1,2-Trans-Dichloroethylene	<5	<5
			1,1,1-Trichloroethane	<5	<5
			1,1,2-Trichloroethane	<5	<5
			Trans-1,3-dichloropropene	<10	<10
			Trichloroethylene	<5	<5
			Vinyl chloride	<10	<10

				Page _	16 of 19
Client:	Golder As	ssociates		ABI Nu	mber: 202-327
Project:	Sudhel/B	Luff Rd. S.C.	Client N		Number:
			(Invoice to)		079.5.4
	2222 01				No. 85-0103-0118
Address:	Suite 165	asantdale Road	Same		************
		GA 30340		* For	In-House Use *
	neranea,	G/1 20240		*	*
Attention:	Mr. A.E.	Stone, Jr.		*	
******	******	*****	******		********
Sample: _	_water _x so	oiltissue	Sampled t	by: A.E. St	one, Jr.
Other: _			ABI Manag	ger: F. Ghee	sling
Sample		Sample	Report	Report	
	11/85	Received: 1/10		Issued:	6/7/85
******	*********	******		*******	******
Sample	Book/Page			Run 1	Run 2
number	Number	Station	Test required	Results	Results
71013		47.3	OR MIC NO. ATTLES	(ppb)	(ppb)
T1863		17-3	GC/MS VOLATILES		
			Benzene	3	153
			Bromoform	<10	<10
		ECHIP ST-			
		Sample 3	Carbon tetrachloride	<5	<5
			Chlorobenzene	<5	<5
			Chlorodi-bromomethane	<5	<5
			Chloroethane	<10	<10
			2-Chloroethylvinyl ether	<10	<10
			Chloroform	3	8
			Cis-1,3-dichloropropene	<10	<10
			Dichlorobromomethane	(5	<5
			1,1-Dichloroethane	<5	<5
			1,2-Dichloroethane	<10 <5	<10 <5
			1,1-Dichloroethylene 1,2-Dichloropropane	<10	<10
			, L Dichitor opt opane	110	
			Ethylbenzene	<5	<5
			Methyl bromide	<10	<10
			Methyl chloride	<10	<10
			Methylene chloride	11	177
			1,1,2,2-Tetrachloroethane	<10	<10
			Tetrachloroethylene	<5	<5
			Toluene	2	353
			1,2-Trans-Dichloroethylene	<5	<5
			1 1 1-Trichloroathana	6	<5
			1,1,1-Trichloroethane 1,1,2-Trichloroethane	(5	65
			Trans-1,3-dichloropropene	<10	<10
			Trichloroethylene	<5	(5
			Vinyl chloride	<10	<10

				Page	17 of 19	
Client: Golder Associates Project: Sudhel/Bluff Rd. S.C.					mber: 202-327	
Project:	odditc1/	bidii ka. S.C.	(Invoice to)		Client Number: 853-3079.5.4	
Address:	3772 PI	easantdale Road	Same		No. 85-0103-0118	
Audi ess.	Suite 1		Jane		In-House Use *	
	Atlanta	, GA 30340		*		
Attention	: Mr. A.E	. Stone, Jr.				
*****	*****	soil tissue	**************************************		**************************************	
Sample: _	_water _x	tissue			one, Jr.	
Other: _			ABI Mar	mager: F. Ghee	sling	
Sample Taken: 1	/11/85	Sample Received: 1/16	Report 5/85 Required: 4/30/85	Report Issued:	6/7/85	
Sample	Book/Page	~~~~	*******	Run 1	Run 2	
number	Number	Station	Test required	Results	Results	
T1864		19-2	GC/MS VOLATILES	(ppb)	(ppb)	
					211	
			Benzene Bromoform	4 <10	313 <10	
		2 ST-19		(10		
		Sample 2	Carbon tetrachloride	<5	<5	
		Dringic s	Chlorodi-bromomethane	<5 <5	<5 <5	
			Chloroethane	<10	<10	
			2-Chloroethylvinyl ether	<10	<10	
			Chloroform	1	11	
			Cis-1,3-dichloropropene	13	<10	
			Dichlorobromomethane	<5	<5	
			1,1-Dichloroethane	<5	<5	
			1,2-Dichloroethane	<10	<10	
			1,1-Dichloroethylene	<5	<5	
			1,2-Dichloropropane	<10	<10	
			Ethylbenzene	<5	<5	
			Methyl bromide	<10	<10	
			Methyl chloride	<10	<10	
			Methylene chloride	16	400	
			1,1,2,2-Tetrachloroethane	<10	<10	
			Tetrachloroethylene	<5	<5	
			Toluene	3	521	
			1,2-Trans-Dichloroethylene	<5	<5	
			1,1,1-Trichloroethane	7	7	
			1,1,2-Trichloroethane	<5	<5	
			Trans-1,3-dichloropropene	<10	<10	
			Trichloroethylene	<5	<5	
			Vinyl chloride	<10	<10	

					Page _	18 of 19
Client:	Golder	Associates			ABI Number: 202-327	
Project: Sudhel/Bluff Rd. S.C.					Client	Number:
			(Invoice to)		853-3079.5.4	
Address:	3772 P1	easantdale Road	Same		P.O.	No. 85-0103-0118
	Suite 1	65	Canc			In-House Use *
	Atlanta	, GA 30340			*	*
Attention:	Mr. A.E	. Stone, Jr.			*	
******			******			******
Sample:	water x	soiltissue		Sampled by:	A.E. St	one, Jr.
Other:				ABI Manager:	F. Ghee	sling
Sample		Sample	Report		Report	
	11/85	Received: 1/16	8/85 Required	1: 4/30/85	Issued:	6/7/85
	Book/Page		******		Run 1	Run 2
	Number	Station	Test required		Results	Results
T1878		2-2	CC/MS VOLATILES		(ppb)	(ppb)
11070		2-2	GC/MS VOLATILES			
			Benzene		2	222
		Erra ST-2	Bromoform		<10	<10
			Carbon tetrachlori	de	(5	<5
		Jampie 2	Chlorobenzene		<5	<5
			Chlorodi-bromometh	nane	<5	<5
			Chloroethane		<10	<10
			2-Chloroethylvinyl	ether	<10	<10
			Chloroform		3	9
			Cis-1,3-dichloropr		<10	<10
			Dichlorobromometha	ine	<5	<5
			1,1-Dichloroethane		<5	<5
			1,2-Dichloroethane		<10	<10
			1,1-Dichloroethyle	ene	<5	<5
			1,2-Dichloropropan	ie	<10	<10
			Ethylbenzene		<5	<5
			Methyl bromide		<10	<10
			Methyl chloride		<10	<10
			Methylene chloride		8	280
			1,1,2,2-Tetrachlor	oethane	<10	<10
			Tetrachloroethylen	ne	<5	<5
			Toluene		<5	498
			1,2-Trans-Dichloro	pethylene	<5	<5
			1,1,1-Trichloroeth	nane	6	4
			1,1,2-Trichloroeth		<5	<5
			Trans-1,3-dichloro		<10	<10
			Trichloroethylene		<5	<5
			Vinyl chloride		<10	<10

				Page _	19 of 19	
Client:	Golder	Associates		ABI Nu	umber: 202-327	
Project:	Sudhel/	Bluff Rd. S.C.		Client	Client Number: 853-3079.5.4	
			(Invoice to)			
				P.0.	No. 85-0103-0118	
Address:		easantdale Road	Same	*****	******	
	Suite 1			* For	In-House Use *	
	Atlanta	, GA 30340			*	
Attention	. Mr AF	Stone 7-				
	: MI . A.C	. Stone, Jr.	**********	******	*************	
Sample: _	_water _x	soiltissue	Sampled by		cone, Jr.	
Other: _	Other:		ABI Manage	r: F. Ghee	esling	
Sample		Sample	Report	Report		
The state of the s	/11/85	Received: 1/16		Issued:	6/7/85	
******	*******	********	*********	******	***********	
Sample	Book/Page			Run 1	Run 2	
number	Number	Station	Test required	Results	Results	
			22/110 1101 1771 50	(ppb)	(ppb)	
T 1879		15-2	GC/MS VOLATILES			
			Benzene	39	15	
			Bromoform	<10	<10	
		Per 10 57-15		(10		
			Carbon tetrachloride	(5	(5	
		Sanjea	Chlorobenzene	<5	<5	
			Chlorodi-bromomethane	(5	<5	
			Chloroethane	<10	<10	
			2 Chlomosthylyical other	<10	<10	
			2-Chloroethylvinyl ether Chloroform	5	16	
				<10	<10	
			Cis-1,3-dichloropropene Dichlorobromomethane	<5	<5	
			DICHIOLODI GIIOINE CHANE			
			1,1-Dichloroethane	<5	<5	
			1,2-Dichloroethane	<10	<10	
			1,1-Dichloroethylene	<5	<5	
			1,2-Dichloropropane	<10	<10	
			Ethylbenzene	<5	(5	
			Methyl bromide	<10	<10	
			Methyl chloride	<10	<10	
			Methylene chloride	44	29	
			1 1 2 2 Tetrachlomoethage	<10	<10	
			1,1,2,2-Tetrachloroethane Tetrachloroethylene	<5	<5	
			Toluene	20	28	
			1,2-Trans-Dichloroethylene	<5	<5	
			, - Tane Samuel Good of Lone			
			1,1,1-Trichloroethane	11	16	
			1,1,2-Trichloroethane	<5	<5	
			Trans-1,3-dichloropropene	<10	<10	
			Trichloroethylene	<5	<5	

Vinyl chloride

<10

<10

